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Journal

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CONTENTS / MAY 1960 / VOLUME 36, NUMBER 5

Nutritive Value of Diets Today and Fifty Years Ago
KATHLEEN STITT 433

Food Restriction and Cholesterol Metabolism. Effect on Cholesterol Metabolism of Limiting the Time Food Is Accessible
RUTH OKEY, PH.D., GENEVIEVE SCHEIER, AND MARSHIA REED 441

Magnesium in Beef, Eggs, Chicken, and Beef Gravy
ELIZABETH ANNE FOX, ROBERTA E. BLEILER, PH.D., AND MARGARET A. OHLSON, PH.D. 445

Metabolic Responses of Young Women While Reducing. Body Fatness and Nitrogen Metabolism
CHARLOTTE M. YOUNG, PH.D., BARBARA A. GEHRING, SUSAN H. MERRILL, AND M. ELIZABETH KERR 447

Some Problems in Collecting Dietary Data from Individuals
SADYE F. ADELSON 453

Bone Density of East Indian and American Students
DOROTHY E. WILLIAMS, PH.D., AND ANN SAMSON 462

The Teaching Dietitian's Place in Nursing Education
LULU WOLF HASSENPLUG, R.N. 467

Current Comment
Nursing Education at the College Level—MARY E. KELLY 472
An Associate Degree Program in Nursing—KATHRYN W. CAFFERTY, R.N., ED.D. 473
The Dietitian in a Diploma Nursing Program—MILDRED L. BROWN, R.N. 474

Winifred Howard Erickson, June 19, 1896—March 27, 1960 476

Book Reviews 477

Current Literature 478

News Notes 518

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Nutritive Value of Diets Today and Fifty Years Ago[1]

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CURRENT CONCERN regarding the kind and amount of fat and fatty acids in the average diet and popular interest in vitamins stimulate questions as to whether our consumption of these nutrients has changed since the beginning of the century. From 1895 to 1903, numerous dietary studies were made by Atwater and his associates in the Office of Experiment Stations in the United States Department of Agriculture. Food composition tables available at that time made it possible to calculate only protein, fat, carbohydrate, and total calories.

The purposes of this study were to recalculate the dietary studies made by Atwater and his associates in terms of certain minerals, vitamins, and fatty acids and to compare the nutritive values with those obtained in the (a) Department of Agriculture's Household Food Consumption Survey conducted in 1955 (1) and (b) with the Recommended Dietary Allowances (2).

Procedure

SOURCE MATERIAL

Over three hundred weighed dietary studies were reported from the Office of Experiment Stations of the United States Department of Agriculture between 1895 and 1910. Fifty studies (3-13) were selected from this group which included rural and urban families and boarding clubs; we omitted studies in public institutions and those dealing with Mexican and Negro families. Descriptive data for the composition of the groups, geographical location, economic status, and length of period of study are given in Table 1.

For purposes of brevity, the studies of 1895 to 1903 will be referred to hereafter as "diets of 1900" or "early diets."

[1]Received for publication January 4, 1960.

[2]Appreciation is expressed to E. Neige Todhunter, Ph.D., Dean of the School of Home Economics, for her advice in planning the study and preparation of the paper.

METHOD OF CALCULATING NUTRITIVE VALUE OF DIETS

Atwater and associates calculated the early diets on a "per man" basis using data provided in *The Chemical Composition of American Food Materials* (14). These diets were recalculated for calories, protein, fat, total saturated fatty acids, total unsaturated fatty acids, linoleic acid, vitamin A, thiamine, riboflavin, niacin and niacin equivalents, ascorbic acid, calcium, and iron. Sources of nutrient composition of foods were: *Composition of Foods —Raw, Processed, Prepared* (15), *Food Values of Portions Commonly Used* (16), "Fatty Acids in Food Fats" (17), and *Amino Acid Content of Foods* (18). For certain prepared foods, recipes were supplied by the American Institute of Baking (19) and National Biscuit Company (20), and the nutritive value of the recipes was calculated.

The early investigators used factors for calculating the number of persons in the studies which are different from those used in current dietary investigations; therefore, the number of persons or units in each study has been recalculated as "nutrition units." The term, "one nutrition unit" as used in this paper is equivalent to the amount of each nutrient which is recommended by the National Research Council for a twenty-five-year-old man (2). For example, a twenty-five-year-old woman would need 0.72 units of calories (2300 divided by 3200 or 0.72). The units for older men and women and for the children were calculated by the same method. To determine the number of units per dietary study, the number of meals eaten by each member of the family was divided by three; this number was then multiplied by the appropriate factor for each nutrient. For example, a twenty-five-year-old woman ate thirty meals equivalent to ten days; the number of nutrition units for calories is obtained by multiplying 10 by 0.72, which equals 7.2 units. Because there is no recommended dietary allowance for fat, this nutrient was calculated per person per three-meal day.

TABLE 1 **Description of source material for dietary studies, 1895-1903**

DESCRIPTION OF GROUP	NUMBER OF STUDIES	DAYS OF STUDY	OCCUPATION	STATE	INVESTIGATORS
Urban, good circumstances	1 family	7	mechanic	Tenn.	Wait (4)
	2 families	14	teacher and tinner	Ind.	Stone (6)
	1 family	21	mechanic	N.J.	Voorhees (7)
	1 family	30	lawyer	Pa.	Bevier (8)
	1 family	30	decorator	Pa.	Bevier (8)
	1 family	31	glass blower	Pa.	Bevier (8)
	2 families	14	mechanic	Tenn.	Wait (9)
	1 family	14	teacher	Ill.	Grindley *et al.* (11)
	1 family	21	chemist	Calif.	Jaffa (10)
Urban, poor circumstances	2 families	29	mill workers	Pa.	Bevier (8)
	1 family	8	boiler tender	Pa.	Bevier (8)
	10 families	10	*	N.Y.	Atwater and Bryant (12)
Rural	4 families	10 or 11	1 research worker and 3 farmers	Vt.	Hills *et al.* (13)
	8 families	14	laborer†	Tenn.	Hills *et al.* (13)
	3 families	14	farmer	Ga.	Hills *et al.* (13)
Boarding clubs	3 men's‡ clubs	7, 7, 14	students	Tenn.	Wait (4)
	2 men's‡ clubs	6, 7	students	Mo.	Gibson *et al.* (5)
	2 men's‡ clubs	14	students	Tenn.	Wait (9)
	1 men's‡ club	14	mechanics	Ill.	Grindley *et al.* (11)
	1 women's‡ club	20	students	N. Dak.	Grindley *et al.* (11)
	1 women's‡ club	10	students	Ohio	Grindley *et al.* (11)
	1 men's and women's club	30	primarily laborers	Conn.	Atwater (3)

*Gripman, longshoreman, plumber, truckman, washerwoman, carpenter, housekeeper.
†Teamster, washerwoman, section hand, brick mason or foreman.
‡Primarily of this sex.

TABLE 2 **Comparison of distribution of calories in diets of 1895 to 1903 and 1955**

YEAR	PERCENTAGE OF CALORIES OBTAINED FROM					
	Fat		Protein		Carbohydrate	
	Average	Range	Average	Range	Average	Range
1895-1903	38	21–48	12	7–16	51	41–69
1955	44	—	13	—	43	—

Waste for the individual foods was not given in the early studies; therefore, the calculations were based on the amount of food as purchased.

Methods of food preparation in the early dietary studies were not given; therefore no attempt was made to calculate losses of nutritive value during cooking. In the 1955 study made by the Department of Agriculture, estimated average losses in cooking for thiamine, riboflavin, niacin, and ascorbic acid were deducted.

Results and Discussion

CALORIES

Average caloric content of the early diets was 3646 per nutrition unit with a range of 1916 to 5402 calories. Sixty-eight per cent of the diets met the recommended allowance of 3200 calories (2); 6 per cent of the diets provided less than two-thirds of the recommended number of calories (Figure 1.) The family with the lowest caloric intake, 1916 per nutrition unit, also consumed less than the recommended allowances for all nutrients except niacin.

All the diets of the boarding clubs met the recommendation for calories. The rural families had the highest intake of calories, with a daily average of 4057. Only four of the thirteen urban families in poor circumstances consumed the recommended calories per day.

The caloric intake in the 1955 Household Food Consumption Survey (1) was 4390 calories per nutrition unit compared with 3646 calories in the diets of 1900. It is realized that these two groups of diets are not exactly comparable, because in the earlier studies all food was weighed while in the 1955 survey, the interviewer used the recall method to learn the amount of food the homemaker had used during the previous week. The recent survey included a sample of the entire country while the earlier studies covered only several sections of the country.

Comparison of the early diets with the 1955 dietary survey indicates that there has been an increase in total calories, an increase in the proportion of calories coming from fat, a slight increase in the amount from protein, and a decrease in calories from carbohydrate foods (Table 2).

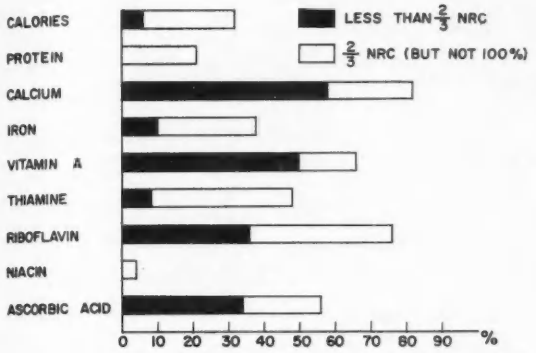

FIG. 1. *Percentage of diets of 1895 to 1903 which did not meet the Recommended Dietary Allowances of 1958.*

PROTEIN

In the early period there was emphasis on a high-protein intake. Atwater (3) recommended 125 gm. protein and 3500 calories for a man doing moderately active work. Protein was found to be one of the nutrients least likely to be deficient in the diets of 1900 (Figure 1.) All of the diets provided at least two-thirds of the recommended allowance of protein (Table 3).

Protein supplied 12 per cent of the calories, and 57 per cent of this protein was from animal sources. However, in the rural groups in Tennessee and Georgia, most of the protein came from vegetable sources, 81 and 91 per cent, respectively, corn meal being the major source of protein.

The protein intake ranged from 49 to 159 gm. per nutrition unit in 1900, with an average of 99 gm. (Tables 3 and 4). The rural families had the lowest intake with an average of 82 gm. protein per day and the boarding clubs had the highest intake, 107 gm.

Comparison of these early diets with the food consumption studies of 1955 (21) shows that the proportion of the total protein of the diet obtained from dairy products has increased while the amount supplied by flour and cereal products (Figure 2) has fallen. Meat provided 39.4 per cent of the total protein in the early diets and 35.9 per cent in 1955 (1).

CALCIUM

Only 18 per cent of the early diets provided the recommended allowance of calcium and 58 per cent of the diets provided less than two-thirds of this amount (Figure 1). Average daily calcium consumption was 0.69 gm. per nutrition unit. The members of the boarding clubs consumed more calcium per nutrition unit than the other groups, and their consumption of dairy products was higher. Five of the rural families consumed no milk or milk products.

Today, consumption of dairy products has increased which probably accounts for the increase in calcium intake, 1.0 gm. compared with 0.69 gm. in 1900. However, not all families in the 1955 studies had an adequate intake of calcium; 29 per cent were reported as not consuming the recommended amount.

IRON

The intake of iron in the early diets was higher in most of the diets except those of urban families in poor circumstances (Table 4). The average intake of iron was 13.7 mg. per nutrition unit per day compared with 19.3 mg. supplied by the diets in 1955 (1). Flour and cereal products, and meat, poultry, and fish contributed over half of the iron in the early diets; this was also the case in 1955 (Figure 2).

The consumption per person of flour and cereal products is less today than in 1900, but enrichment of these products enables this food group to provide approximately the same percentage of the total iron in 1955 as in 1900.

VITAMIN A

The average vitamin A content of the 1900 diets was 5375 I.U. per nutrition unit compared with 9960 I.U. in 1955 (1). Sixty-six per cent of the early diets did not meet the recommended allowance for vitamin A (Figure 1). The low intake of vitamin A in many of the households can be explained by the infrequent use of leafy, green, and yellow vegetables. Of the total vitamin A consumed in 1900, 28.5 per cent came from potatoes and sweet potatoes and 10.1 per cent from leafy, green, and yellow vegetables, whereas in 1955, the amounts were 3.7 per cent and 31.1 per cent, respectively.

TABLE 3 **Comparison of nutrients in diets of 1895 to 1903 with those in 1955 and with 1958 Recommended Dietary Allowances**

COMPARISON	CALORIES	PROTEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN EQUIVALENTS	ASCORBIC ACID
		gm.	*gm.*	*mg.*	*I.U.*	*mg.*	*mg.*	*mg.*	*mg.*
1895-1903	3646	99	0.69	13.7	5375	1.59	1.61	40.4	69
1955	4390	121	1.00	19.3	9960	2.15	2.65	25.8*	117
1958 recommended allowances	3200	70	0.80	10.0	5000	1.60	1.80	21.0	75

*Does not include niacin from tryptophan.

TABLE 4 **Average nutrient intake per nutrition unit in diets of 1895 to 1903**

SOURCE OF DATA	CALORIES	PROTEIN			CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN EQUIVALENTS	ASCORBIC ACID
		Animal	Vegetable	Total							
Urban Families in Good Circumstances											
		gm.	*gm.*	*gm.*	*gm.*	*mg.*	*I. U.*	*mg.*	*mg.*	*mg.*	*mg.*
Reference 4	4,205	56	50	106	0.58	15.7	10,749	2.16	1.80	42.2	126
Reference 6	3,086	74	36	110	0.97	13.6	2,985	1.12	2.09	36.3	50
Reference 6	4,060	61	43	105	0.92	13.6	6,241	1.19	1,78	39.5	78
Reference 7	2,920	43	28	71	0.32	8.9	2,651	1.47	1.01	34.3	90
Reference 8	3,451	45	39	84	0.43	9.9	6,311	1.15	1.58	33.4	47
Reference 8	3,498	54	33	87	0.36	10.3	6,545	1.89	1.45	41.7	96
Reference 8	3,292	55	39	94	0.36	10.8	6,487	1.33	1.23	37.7	59
Reference 9	4,562	31	55	86	0.69	13.3	7,011	3.12	1.38	35.3	110
Reference 9	3,198	57	47	104	0.87	16.1	2,564	2.91	1.58	40.8	75
Reference 11	3,974	76	42	118	0.70	15.1	5,004	1.92	1.77	49.1	101
Reference 10	4,459	110	49	159	0.78	22.1	14,709	2.41	3.23	78.4	145
Urban Families in Poor Circumstances											
Reference 8	2,313	32	28	60	0.27	7.4	1,444	1.21	0.77	26.5	39
Reference 8	2,231	27	32	59	0.25	6.4	4,745	1.23	1.08	26.0	37
Reference 8	4,666	53	64	117	0.41	12.1	2,372	2.24	1.47	49.0	64
Reference 12	3,869	103	36	139	0.90	15.2	6,668	2.28	2.36	59.0	93
Reference 12	2,116	48	19	67	0.29	6.0	2,871	0.98	0.96	28.8	59
Reference 12	1,916	34	17	51	0.28	6.4	1,913	0.87	0.80	22.6	47
Reference 12	2,761	37	38	75	0.39	8.6	11,516	1.31	1.70	39.6	45
Reference 12	3,078	49	41	90	0.40	10.2	2,761	1.39	1.24	41.1	74
Reference 12	2,994	28	33	61	0.45	6.3	1,910	1.11	1.03	27.4	39
Reference 12	2,286	47	24	71	0.41	7.2	2,914	1.04	1.06	31.9	77
Reference 12	3,367	55	38	93	0.74	11.6	7,810	1.64	1.97	42.2	146
Reference 12	2,097	42	26	68	0.31	9.3	2,821	1.05	1.07	32.1	88
Reference 12	3,897	60	35	95	0.47	9.6	2,512	1.72	1.41	43.3	55
Rural Families: Vermont											
Reference 13	3,150	37	40	77	0.56	10.3	1,965	1.19	1.20	29.6	39
Reference 13	4,007	66	45	111	0.76	15.4	4,160	2.18	2.39	46.9	94
Reference 13	4,687	62	55	117	0.99	17.0	5,361	1.94	2.07	43.6	83
Reference 13	3,210	31	34	65	0.55	9.7	4,292	1.19	1.37	27.8	94
Rural Families: Tennessee											
Reference 13	4,946	10	86	96	0.30	12.0	25,028	2.04	0.94	35.1	143
Reference 13	2,735	21	44	65	0.43	8.7	4,409	1.83	1.26	24.8	18
Reference 13	2,814	12	37	49	0.23	5.5	1,926	1.27	0.78	18.1	42
Reference 13	3,406	8	55	63	0.31	10.5	584	1.48	0.72	22.5	15
Reference 13	3,150	13	54	67	0.30	11.0	819	1.80	0.90	23.8	19
Reference 13	5,401	33	100	133	0.79	14.0	563	2.77	2.29	41.1	17
Reference 13	3,539	10	45	55	0.10	7.5	64	1.53	0.48	19.5	33
Reference 13	4,275	8	62	70	0.08	8.5	582	1.62	0.54	25.2	10
Rural Families: Georgia											
Reference 13	4,333	6	69	75	0.24	12.3	2,017	2.55	1.04	34.3	173
Reference 13	5,402	9	92	101	0.45	22.8	1,810	3.78	1.47	42.7	230
Reference 13	5,321	9	82	91	0.24	20.1	134	3.83	1.15	42.3	127
Boarding Clubs											
Reference 4	3,857	54	52	106	0.51	16.8	2,324	1.61	1.25	39.0	28
Reference 4	3,728	54	49	103	0.47	16.0	4,215	1.40	1.19	40.8	44
Reference 4	3,872	46	50	96	0.84	20.1	5,314	1.32	1.59	38.5	70
Reference 5	3,712	59	47	106	1.23	16.4	3,247	1.59	2.01	39.1	64
Reference 5	3,787	65	41	106	1.35	16.7	3,878	1.61	2.28	41.1	67
Reference 9	3,713	90	41	131	1.17	18.9	10,261	1.47	2.08	50.6	66
Reference 9	3,724	24	47	71	0.11	8.5	2,738	1.22	0.85	26.1	52
Reference 11	3,676	76	35	111	0.66	17.1	8,657	1.83	2.06	50.1	130
Reference 11	3,446	30	30	60	0.21	7.8	3,345	1.20	0.79	32.8	49
Reference 11	3,658	56	35	91	0.60	9.9	4,754	1.60	1.52	36.9	76
Reference 3	4,209	79	44	123	0.66	14.8	7,449	1.81	1.79	40.6	93
Averages											
Urban families											
Good circumstances	3,506	58	39	97	0.52	12.5	6,609	1.69	1.67	42.2	81
Poor circumstances	2,597	39	31	70	0.35	7.9	3,576	1.29	1.13	31.6	55
All	3,107	50	35	85	0.44	10.4	5,322	1.52	1.42	37.7	70
Rural families											
Vermont	3,770	51	43	94	0.70	13.2	3,842	1.69	1.83	38.2	78
Tennessee	3,674	14	57	71	0.29	9.5	2,978	1.77	0.92	25.5	28
Georgia	4,972	8	79	87	0.30	17.6	1,385	3.32	1.20	39.3	176
All	5,057	22	60	82	0.39	12.7	2,778	2.18	1.24	32.8	82
Boarding clubs	3,766	65	42	107	0.86	15.1	5,779	1.54	1.74	42.4	67
All studies	3,646	56	43	99	0.69	13.7	5,375	1.59	1.61	40.4	69

TABLE 5 **Average fat consumption per person per day and per cent of calories from fat and fatty acids in diets of 1895 to 1903**

SOURCE OF DATA	TOTAL FAT		FATTY ACIDS					
			Saturated		Unsaturated		Linoleic	
	Weight	Per cent of calories	Weight	Per cent of calories	Weight	Per cent of calories	Weight	Per cent of calories
Urban Families in Good Circumstances								
	gm.		*gm.*		*gm.*		*gm.*	
Reference 4	186	48	71	18	104	27	15	4
Reference 6	102	34	47	16	49	16	6	2
Reference 6	144	37	63	16	71	18	10	2
Reference 7	101	39	41	16	53	20	8	3
Reference 8	127	42	61	20	58	20	7	2
Reference 8	100	41	43	18	50	21	7	3
Reference 8	111	36	48	16	55	18	7	2
Reference 9	168	44	63	16	96	25	16	4
Reference 9	121	41	47	16	64	22	10	4
Reference 11	134	35	59	16	66	17	9	2
Reference 10	178	45	81	20	86	22	12	3
Urban Families in Poor Circumstances								
Reference 8	74	37	32	16	38	19	5	2
Reference 8	62	35	24	14	32	18	5	3
Reference 8	96	32	42	14	50	17	8	3
Reference 12	158	41	67	18	80	21	13	3
Reference 12	75	43	34	19	37	21	5	3
Reference 12	66	42	28	18	34	21	5	3
Reference 12	56	27	21	10	31	15	7	3
Reference 12	81	38	36	17	40	19	7	3
Reference 12	80	38	32	15	43	20	8	4
Reference 12	87	39	38	17	43	19	7	3
Reference 12	110	34	48	15	53	17	8	2
Reference 12	67	32	29	14	34	16	4	2
Reference 12	157	45	68	19	80	23	13	4
Rural Families: Vermont								
Reference 13	77	26	37	13	34	12	4	2
Reference 13	121	34	54	15	58	16	8	2
Reference 13	159	35	74	16	74	16	9	2
Reference 13	97	36	45	17	45	17	7	2
Rural Families: Tennessee								
Reference 13	139	29	49	10	81	17	14	3
Reference 13	41	21	15	8	23	12	6	3
Reference 13	51	30	22	12	26	15	4	2
Reference 13	102	37	37	13	59	22	10	4
Reference 13	79	28	29	10	45	16	9	3
Reference 13	115	27	40	9	68	16	13	3
Reference 13	147	48	53	17	86	28	14	4
Reference 13	117	33	43	12	68	19	12	3
Rural Families: Georgia								
Reference 13	90	26	28	8	55	16	12	3
Reference 13	135	28	42	9	84	17	19	4
Reference 13	118	24	36	7	75	16	18	4
Boarding Clubs								
Reference 4	148	35	60	14	78	18	13	3
Reference 4	133	33	55	14	68	17	12	3
Reference 4	135	32	56	13	68	16	12	3
Reference 5	167	41	62	15	96	24	27	7
Reference 5	180	44	69	17	101	25	40	10
Reference 9	145	36	67	17	68	17	8	2
Reference 9	158	41	65	17	84	22	14	4
Reference 11	168	43	73	19	83	21	11	3
Reference 11	98	34	46	16	47	16	6	2
Reference 11	111	38	57	20	53	18	6	2
Reference 3	175	44	82	21	82	21	9	2
Averages								
Urban families								
Good circumstances	127	41	55	18	63	20	9	3
Poor circumstances	80	37	34	16	41	19	6	3
All	105	39	45	17	53	20	8	3
Rural families								
Vermont	112	33	52	15	52	15	7	2
Tennessee	94	31	34	12	54	18	10	3
Georgia	112	26	35	8	69	16	16	4
All	103	30	39	11	58	17	11	3
Boarding clubs	146	38	63	17	74	20	15	4
All studies	131	38	56	16	67	19	12	4

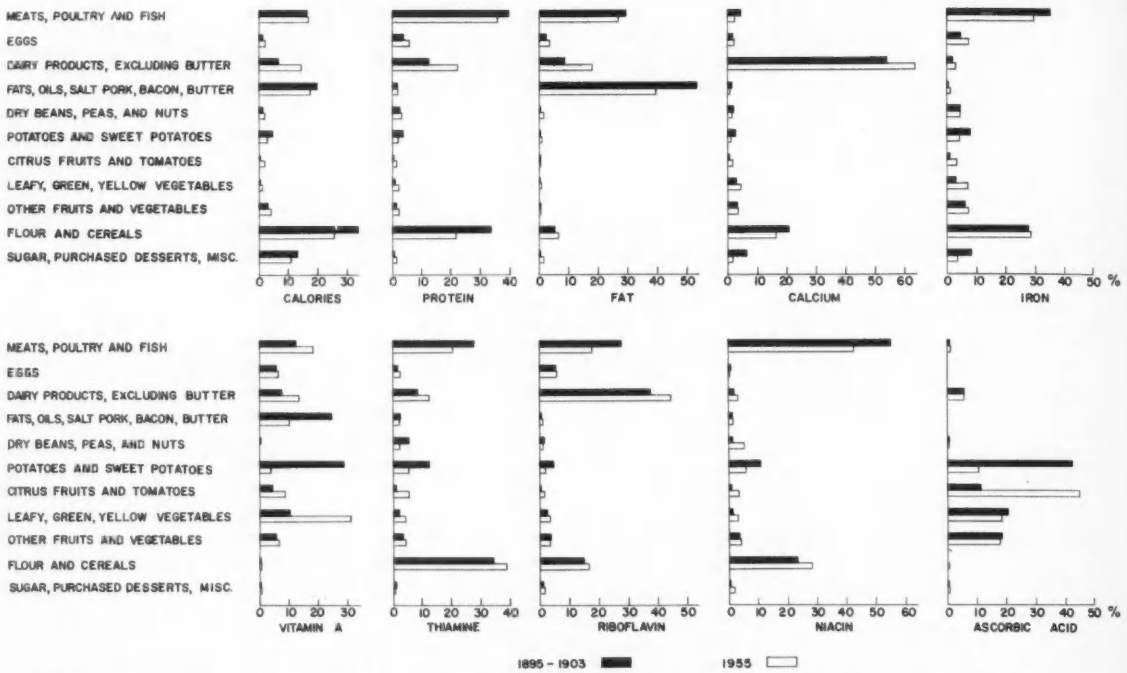

FIG. 2. *Percentages of total nutrients contributed by food groups in the period from 1895 to 1903 and in 1955.*

THIAMINE

A daily average of 1.59 mg. thiamine per nutrition unit with a range from 0.87 to 3.83 mg. was found in the early diets compared with 2.15 mg. in 1955. When thiamine intake is considered in terms of caloric consumption, the early average was 0.44 mg. thiamine per 1000 calories, ranging from 0.29 to 0.92 mg. compared with the recommendation of 0.50 mg. per 1000 calories. The boarding clubs had the lowest intake of thiamine per 1000 calories, 0.41 mg. Cooking losses were not deducted in the early diets; therefore, the intake was probably less than the figures indicate.

Fifty-two per cent of the early diets met the allowance for thiamine. The rural families consumed more thiamine than the other groups, with much of this vitamin coming from cereal and grain products. Some of the cereal and grain products were whole grain, while the others were unenriched in this period. Although the per capita consumption of flour and cereals has decreased, this food group continues to be the main source of dietary thiamine because of enrichment.

RIBOFLAVIN, NIACIN, AND NIACIN EQUIVALENTS

Riboflavin intake has increased in the past fifty years. The average obtained in the early diets was 1.61 mg. per nutrition unit compared with 2.65 per day in the 1955 survey. Thirty-six per cent of the early diets contained less than two-thirds of the recommended allowance of riboflavin. The increased intake of riboflavin can also be attributed to the enrichment of grain products and the increased consumption of dairy products.

The Recommended Dietary Allowances for 1958 give niacin in terms of niacin equivalents. The average content of the early diets was 40.4 mg. niacin equivalents. Only two of the early diets did not meet the recommended allowance, and these, which were both rural diets, did not meet the recommended allowances of most of the other nutrients. Approximately 52 per cent of the niacin equivalents came from tryptophan.

The average niacin content of the early diets was 19.2 mg. per nutrition unit compared with 25.8 mg. in 1955.

ASCORBIC ACID

The 1900 diets provided an average of 69 mg. ascorbic acid per nutrition unit while in 1955 the comparable figure was 117 mg. The difference is larger than these figures indicate, however, since no allowance for cooking losses was made in the early studies and deduction for such losses was made in the 1955 survey.

The ascorbic acid content of the early diets ranged from 10 mg. to 230 mg. (Table 4). Forty-four per cent of the diets contained 100 per cent of the allowance, with potatoes being the main source of this vitamin (Figure 2). With the exception of potatoes,

TABLE 6 **Comparison of total fat and fatty acids in diets of 1895 to 1903 and of 1955**

YEAR	TOTAL FAT INTAKE		INTAKE OF SATURATED FATTY ACIDS		INTAKE OF UNSATURATED FATTY ACIDS					
					Oleic acid		Linoleic acid		Total	
	Weight	Per cent of calories	Weight	Per cent of calories	Weight	Per cent of calories	Weight	Per cent of calories	Weight	Per cent of calories
	gm.		*gm.*		*gm.*		*gm.*		*gm.*	
1895-1903	131	38	56	16	—	—	12	4	67	19
1955	155.1	44	65.1	18	66.3	19	16.4	4.6	—	—

fresh vegetables and fruits were at that time considered too expensive in terms of their known nutritive value. The urban families in good circumstances and the rural families in Georgia and Vermont had the highest intakes. Potatoes provided most of the small amount of ascorbic acid in the Tennessee rural diets.

FATS

Type of Fat Used. Margarine was introduced in this country in the late part of the last century. Mege Mouries, a Frenchman, took out a patent in England in 1869 for making imitation butter from animal fats (22). In 1873, the process was patented in this country. This same year, a large company was organized in New York City for the manufacture of this product. The formula for making this imitation butter included about 500 lb. beef fat, 100 lb. milk, and about 30 lb. salt and artificial coloring to make it resemble dairy butter. The imitation butter was reported to smell and taste so much like butter and be so much like the genuine product in appearance that it was impossible for any except the most skillful experts to distinguish the difference (23). In 1882, the manufacture of imitation butter was approximately 20 million lb. or about one-fifth of the total dairy product in New York state (22). The production in the United States in 1883 was 45 million lb., and in 1894 it had increased to 69,622,246 lb. (24).

Another butter substitute on the market around 1900 was called butterine. For the manufacture of butterine, butter, usually of a very good grade, was churned with the oleomargarine and lard to give the flavor; the color was obtained by the addition of annatto and turmeric. Creamery butterine (25) contained 40 per cent butter fat, 15 per cent oleo fat, and 30 per cent neutral fat.

Cottolene was a compound which contained 80 to 85 per cent cottonseed oil and 15 to 20 per cent oleostearin and had a yellow color (26).

Butter, salt pork, and lard were the fats used most frequently in the early diets. Eighty-two per cent of the diets included butter, 76 per cent used lard, and 42 per cent used salt pork. Suet was used in 10 per cent of these diets. Six per cent of these diets contained a butter or lard "substitute," which included butterine, cottolene, or oleomargarine. Cottolene and oleomargarine were used by two boarding clubs, and one urban family in poor circumstances used butterine. These dietary studies were made before the patents for hydrogenated fat were issued in 1912 (26).

Amount of Fat. In 1895, Atwater stated (3) that Americans were consuming too many fatty foods. The total fat per person and the proportion of calories from fat were lower in the early diets than in the diets of the 1955 survey. The early diets included 38 per cent of the total calories as fat, ranging from 21 to 48 per cent, compared with 44 per cent in the 1955 diets. In 1955, the average amount of fat consumed per person per day was 155 gm. compared with 131 gm. in the early diets. There was large variation in the amount of fat consumed per person in the early diets, ranging from 41 to 180 gm. per person. The average consumption of fat of the urban families in poor circumstances was only 80 gm. per day while the percentage of fat calories was 37 per cent.

The southern rural families obtained most of their fat from the fats-and-oil group which included bacon and salt pork. In the 1955 survey, southern families obtained more fat from the fats-and-oil group than did the families in other regions.

There have been changes in the food groups supplying the fat in the diet. The fats-and-oil group contributed a smaller proportion of the total fat in 1955, whereas the amount coming from dairy products, excluding butter, has about doubled in the last half century. Approximately 93 per cent of the fat came from animal sources in 1900.

Fatty Acid Content of Diets. The estimated amount of saturated and unsaturated fatty acids in the diets varied considerably; the saturated fatty acids ranged from 15 to 82 gm. per person per day, while the range for unsaturated fatty acids was from 23 to 104 gm. (Table 5). In only four diets did the saturated fatty acids provide more than 50 per cent of the total fatty acids. The average intake of fatty acids was 56 gm. saturated and 67 gm. unsaturated, of which 12 gm. were linoleic acid.

In 1900, 16 per cent of the calories came from saturated fatty acids and 19 per cent from unsaturated, whereas in 1955, 18 per cent of the total calories

were from the saturated fatty acids and 23.6 per cent from oleic and linoleic acid.

The amount of linoleic acid in the early diets ranged from 4 to 40 gm. per person, with an average of 12 gm. or 4 per cent of the total calories (Table 6). The two diets containing the highest percentage of linoleic acid included cottolene.

Summary

Fifty dietary studies made between 1895 and 1903 by Atwater and his associates of the Office of Experiment Stations, United States Department of Agriculture, were calculated for calories, animal and vegetable protein, total fat, saturated fatty acids, unsaturated fatty acids, linoleic acid, calcium, iron, vitamin A, thiamine, riboflavin, niacin and niacin equivalents, and ascorbic acid.

The average intakes of nutrients per nutrition unit in the early diets were: 3646 calories, 99 gm. protein, 0.69 gm. calcium, 13.7 mg. iron, 5375 I.U. vitamin A, 1.59 mg. thiamine, 1.61 mg. riboflavin, 40.4 mg. niacin equivalents, and 69 mg. ascorbic acid. When the early diets were compared with the results of the 1955 Household Food Consumption Survey, present-day diets were found to be higher in all nutrients.

When the early diets were compared with the 1958 Recommended Dietary Allowances of the National Research Council, more than 30 per cent provided less than two-thirds of the recommended allowances for calcium, vitamin A, riboflavin, and ascorbic acid.

The early diets included 131 gm. or 38 per cent of the total calories as fat compared with 155 gm. or 44 per cent in 1955. Butter, salt pork, and lard were the fats used most frequently in the early diets. The average intake of fatty acids in 1900 was 56 gm. saturated and 67 gm. unsaturated, of which 12 gm. were linoleic acid.

References

(1) U.S. Dept. of Agric.: Dietary Levels of Households in the United States. Household Food Consumption Survey 1955, Rept. No. 6, March, 1957.

(2) Food & Nutrition Bd.: Recommended Dietary Allowances, Revised 1958. Nat. Acad. Sci.—Natl. Research Council Pub. No. 589, 1958.

(3) Atwater, W. O.: Methods and Results of Investigations on the Chemistry and Economy of Food. USDA Off. Exper. Sta. Bull. 21, 1895.

(4) Wait, C. E.: Dietary Studies at the University of Tennessee in 1895. USDA Off. Exper. Sta. Bull. 29, 1896.

(5) Gibson, H. B., Calvert, S., and May, D. W.: Dietary Studies at the University of Missouri in 1895, and Data Relating to Bread and Meat Consumption in Missouri. USDA Off. Exper. Sta. Bull. 31, 1896.

(6) Stone, W. E.: Dietary Studies at Purdue University, LaFayette, Ind., in 1895. USDA Off. Exper. Sta. Bull. 32, 1896.

(7) Voorhees, E. B.: Food and Nutrition Investigations in New Jersey in 1895 and 1896. USDA Off. Exper. Sta. Bull. 35, 1896.

(8) Bevier, I.: Nutrition Investigations in Pittsburgh, Pa., 1894-1896. USDA Off. Exper. Sta. Bull. 52, 1898.

(9) Wait, C. E.: Nutrition Investigations at the University of Tennessee in 1896 and 1897. USDA Off. Exper. Sta. Bull. 53, 1898.

(10) Jaffa, M. E.: Nutrition Investigation at the California Agricultural Experiment Station, 1896-1898. USDA Off. Exper. Sta. Bull. 84, 1900.

(11) Grindley, H. S., Sammis, J. L., Ladd, E. F., Bevier, I., and Sprague, E. C.: Nutrition Investigations at the University of Illinois, North Dakota Agricultural College, and Lake Erie College, Ohio, 1896 to 1900. USDA Off. Exper. Sta. Bull. 91, 1900.

(12) Atwater, W. O., and Bryant, A. P.: Dietary Studies in New York City in 1896 and 1897. USDA Off. Exper. Sta. Bull. 116, 1902.

(13) Hills, J. L., Wait, C. E., and White, H. C.: Dietary Studies in Rural Regions in Vermont, Tennessee and Georgia. USDA Off. Exper. Sta. Bull. 221, 1909.

(14) Atwater, W. O., and Bryant, A. P.: The Chemical Composition of American Food Materials. Rev. USDA Off. Exper. Sta. Bull. 28, 1899.

(15) Watt, B. K., and Merrill, A. L.: Composition of Foods—Raw, Processed, Prepared. USDA Agric. Handbook No. 8, 1950.

(16) Bowes, A. deP., and Church, C. F.: Food Values of Portions Commonly Used. 8th ed. Philadelphia: A. deP. Bowes, 1956.

(17) Goddard, V. R., and Goodall, L.: Fatty Acids in Food Fats. USDA Home Econ. Res. Rept. No. 7, March, 1959.

(18) Orr, M. L., and Watt, B. K.: Amino Acid Content of Foods. USDA Home Econ. Res. Rept. No. 4, Dec., 1957.

(19) Emerson, R. (Am. Inst. of Baking): Personal communication, 1959.

(20) Morch, R. A. (Natl. Biscuit Co.): Personal communication, 1959.

(21) Agric. Research Serv.: Food Consumption and Dietary Levels of Households in the United States—Some Highlights from the Household Food Consumption Survey, Spring 1955. USDA ARS 62—6, Aug., 1957.

(22) Manufacture and sale of oleomargarine. *In* House Reports, 1st Session, 47th Congress 1881-82, Vol. 5, 1882.

(23) Atwater, W. O.: The chemistry of foods and nutrition. I. The composition of our bodies and our food. Century Mag. 34: 59 (May), 1887.

(24) de Schweinitz, E. A.: Butter Substitutes. *In* Yearbook of the United States Department of Agriculture. Washington: Govt. Printing Office, 1895, p. 445.

(25) Report of the Commissioner of Agriculture, 1886. 49th Congress, 1st Session, House of Representatives, Ex. Doc. No. 378. Washington: Govt. Printing Offi., 1887.

(26) Weber, G. M., and Alsberg, C. L.: The American Vegetable-Shortening Industry. Its Origin and Development. Fats and Oils Studies No. 5. Stanford Univ. Food Research Inst., 1934.

Effect on Cholesterol Metabolism of Limiting the Time Food Is Accessible

Food Restriction and Cholesterol Metabolism[1]

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How does omission of meals fit into a weight-reducing regimen which includes decreasing cholesterol deposition?

TO MANY PEOPLE, omission of meals (especially of breakfast) represents a comparatively painless approach to a weight-losing regimen. As dietitians, we have not encouraged this plan. Indeed, we have often taken great pains to formulate programs for reducing that will keep our patients from becoming hungry while parting with extra pounds. However, it is surprisingly difficult to find experimental data to support the opinion that three to five very small meals are always to be preferred to one or two full-sized ones. When the purpose of a weight-losing regimen is not only to lose pounds but also to decrease deposition of cholesterol in tissues, the effect of fasting on cholesterol metabolism becomes important.

A large portion of the body's cholesterol is known to originate in tissue through synthesis from smaller molecules. Acetate, which is formed from both carbohydrate and fat in the course of intermediary metabolism, is known to be important as a building stone for cholesterol synthesis. Liver slices of fasted rats lost their capacity to incorporate radioactive acetate into cholesterol (1). Fasting was found to have a depressant effect on the formation of fat from acetate C^{14} in the intact rat. Refeeding stimulated fat synthesis from labeled acetate, but had little effect on the synthesis of cholesterol (2). Further study (3), however, showed that incorporation of labeled acetate into cholesterol by liver slices was stimulated by refeeding after a fast.

When rats have unlimited access to food, they observe no regular mealtimes, but eat their food bit by bit throughout the 24 hr. In contrast, the animal that has his food intake limited—for example, a pair-fed control of a vitamin-deficient rat—is likely to consume his entire day's supply of food immediately after it is offered. He may, therefore, fast for a considerable portion of the day. Rats subjected to trained feeding, that is, to a time limitation on access to food, may, if given a long enough period in which to do so, actually develop a sufficiently large digestive tract to take care of a full day's supply of food after only an hour's feeding. They may, therefore, exhibit a near-normal rate of growth.

We became interested in the relationship of intervals between eating to cholesterol metabolism when we observed that pair-fed rats on a biotin-deficient diet retained much more C^{14}-labeled acetate in liver fat and cholesterol than did their *ad libitum*-fed controls (4). This paper reports liver and serum cholesterol variations in relation to food intake and weight gain in two experiments, one with rats given access to food during a single 3-hr. period daily, and another fed during one morning and one afternoon hour each day.

Experimental Methods

For the study of a single period of access to food, a seven-week experiment was chosen—the same duration as our study of the effect of fats of different composition on cholesterol storage (5).

One hundred and ninety-six animals, half males and half females, were divided into four groups: (a) controls fed *ad libitum* to the time of autopsy; (b) controls fed *ad libitum* but fasted overnight preceding autopsy; (c) animals allowed access to food for only 3 hr. a day, beginning four days after weaning; and (d) animals fed *ad libitum* for three weeks after weaning and then given access to food

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for only 3 hr. a day. All animals were placed on the experimental diet at weaning. The 10 per cent cottonseed oil diet described previously was fed, without additions, to half of the rats, and with 1 per cent added cholesterol to the other half. All animals were sacrificed seven weeks after weaning.

In a second experiment with 120 additional rats, the experimental animals had access to food from 8 to 9 o'clock in the morning and from 4 to 5 o'clock in the afternoon. All of the experimental animals in this case were placed on restricted food intake three weeks after weaning and were sacrificed nine weeks after weaning. *Ad libitum* controls autopsied at the same time were therefore older than those in the first experiment, hence were not directly comparable.

At autopsy, the livers and serums were prepared for analysis. Total lipids and total and free cholesterol of livers were determined by the methods previously described (6). Serum cholesterols were determined by the method of Sperry and Webb (7). Data are summarized in Table 1.

Results and Discussion

FOOD INTAKE AND WEIGHT GAINS

From the weight data (Table 1) it may be seen that the animal with limited time of access to food at weaning had more difficulty in adjusting to a single meal time than did the rat that began such a regimen three weeks after weaning, i.e., after his first period of rapid growth. Also, the ratios of weight gains and food intakes for the animals beginning restricted access to food three weeks after weaning to those of their *ad libitum* controls were proportionately higher than the corresponding ratios for rats whose food intakes were restricted from weaning. The total growth of the older animals fed twice daily resembled that of their *ad libitum* controls even more closely. It seems probable that, in the animals restricted with respect to time of access to food, we are dealing with delayed growth rather than with any alteration in growth potential.

Stomachs of the 3-hr. animals were proportionately larger than those of the animals fed twice daily, or even of *ad libitum controls,* reflecting the animal's adjustment to its feeding schedule.

In general, the data indicate that weight gains can be expected to be quite closely proportional to food intakes, regardless of time of access to food. Casual inspection of the data from the two experiments might lead to the conclusion that the 3-hr. meal was more effective as a means of weight control than were the two 1-hr. meals. However, at the time of autopsy, the animals on the 3-hr. feedings were gaining weight quite as rapidly as their companions fed twice daily at the same age (seven weeks) and might consequently have been expected to "catch up" at nine weeks.

LIVER FINDINGS

Liver weights were lowered appreciably by overnight fasting, a finding important to the investigator who must evaluate the extent to which weight loss affects the amount and concentration of liver lipid. The data suggest that water and glycogen may account for most of the weight lost overnight and that percentage concentration of lipid is, therefore, a poor index of liver lipid retention. However, liver weights of the animals fed for limited periods daily were sufficiently lower than those of their *ad libitum*-fed controls to indicate smaller amounts of active hepatic tissue. When liver weights were expressed as percentages of body weights, the only figures appreciably lower than those for the *ad libitum* controls were those for the 3-hr. males on diets containing cholesterol.

Liver lipids calculated as milligrams per liver were significantly decreased by restriction of time of access to food. Males showed decreases in percentage of liver lipids which were usually significant. In females, restriction of time of access to food had little effect on concentration of liver lipids, and decreases in amounts were somewhat smaller than those observed in males.

Percentages of liver cholesterol were higher in males fasted overnight than in males fed the same diets *ad libitum* to the time of autopsy. Absolute amounts varied but little with overnight fasting, indicating, as noted above, that the loss of weight during the overnight fast must represent a loss of non-lipid constituents.

Females fed cholesterol differed both from all males and from females without cholesterol in that the groups fasted overnight had lower percentages as well as lower amounts of liver cholesterol. Body weights of this group were less than those of the controls fed the same diet to autopsy. Hence it is hardly safe to conclude definitely that the loss of cholesterol was due to a more rapid mobilization in females than in males. Nevertheless, the high serum cholesterols in this group of females suggested that such might be so.

Limitation of time of access to food actually increased percentages of liver cholesterol in non-cholesterol-fed males and in the cholesterol-fed group with 3-hr. restriction begun at weaning. Only in the cholesterol-fed rats with two 1-hr. periods of access to food was the percentage of liver cholesterol very significantly decreased.

Percentages of free liver cholesterols were slightly increased by overnight fasting in all groups except the cholesterol-fed males (Table 1). Differences between the groups with restricted food intake and their controls on the same diet were probably not significant. However, cholesterol-fed animals consistently had percentages of liver cholesterol about 0.1 per cent higher than those of the animals fed no

TABLE 1 **Effect on limitation of time of access to food on weight gain, liver findings, and serum cholesterol in rats**

DIETARY VARIATION	FEEDING REGIMEN	SEX OF ANIMALS	FOOD INTAKE	WEIGHT GAIN	LIVER FINDINGS						TOTAL SERUM CHOLESTEROL
					Weight	Total lipids		Total cholesterol		Free Cholesterol	
						Weight	Per cent	Weight	Per cent		
Experiment I—Autopsy Seven Weeks after Weaning											
			gm.	*gm.*	*gm.*	*mg.*		*mg.*		%	*mg./100 gm.*
Without cholesterol	*ad libitum*	male	562±14*	209± 8	9.6±0.3	509± 66	5.3±0.6	27.1±2.7	0.28±0.03	0.18±0.06	69.6± 3.8
Without cholesterol	overnight fast	male	605±23	225±11	9.2±0.5	484± 63	5.2±0.5	27.6±2.8	0.30±0.02	0.21±0.04	65.6± 4.0
Without cholesterol	one 3-hr. feeding beginning at weaning	male	363±25	134±12	5.9±0.4	293± 25	4.5±0.3	20.9±1.5	0.32±0.02	0.22±0.01	63.1± 0.7
Without cholesterol	one 3-hr. feeding beginning 3 weeks after weaning	male	473±13	153± 7	5.8±0.2	283± 28	4.8±0.3	18.5±1.5	0.32±0.02	0.24±0.01	62.0± 2.5
With cholesterol	*ad libitum*	male	588±23	226±13	13.6±1.1	2311±362	16.2±1.7	344±45	2.52±0.26	0.31±0.01	85.4± 1.0
With cholesterol	overnight fast	male	580±24	214±12	11.7±0.8	2487±282	20.6±1.6	326±23	2.78±0.08	0.31±1.00	65.1± 4.9
With cholesterol	one 3-hr. feeding beginning at weaning	male	330± 7	118± 4	6.7±0.3	1290±179	18.8±2.0	216±29	3.17±0.33	0.31±0.02	60.6± 5.0
With cholesterol	one 3-hr. feeding beginning 3 weeks after weaning	male	431±18	134± 8	6.9±0.5	1204±140	17.2±1.8	195±18	2.73±0.10	0.29±0.01	69.2± 5.0
Without cholesterol	*ad libitum*	female	512±14	157± 6	6.6±0.2	285± 10	4.4±0.2	12.4±0.08	0.19±0.01	0.20±0.01	82.1± 5.7
Without cholesterol	overnight fast	female	490±10	142± 5	5.2±0.1	285± 18	5.5±0.3	15.1±0.60	0.29±0.01	0.25±0	76.9± 3.7
Without cholesterol	one 3-hr. feeding beginning at weaning	female	308±13	89± 6	4.0±0.2	186± 16	4.7±0.6	10.9±0.40	0.27±0.01	0.23±0.01	68.1± 4.0
Without cholesterol	one 3-hr. feeding beginning 3 weeks after weaning	female	390±11	102± 5	4.7±0.2	219± 29	4.7±0.7	12.3±0.80	0.26±0.01	0.23±0.01	75.7± 5.0
With cholesterol	*ad libitum*	female	544±12	165± 5	8.5±0.4	952±105	11.1±0.8	201±27	2.49±0.48	0.28±0.01	132.0±11.5
With cholesterol	overnight fast	female	492±13	144± 6	6.4±0.3	794±130	12.2±1.5	136±19	2.14±0.29	0.33±0.01	148.0±27.0
With cholesterol	one 3-hr. feeding beginning at weaning	female	328± 7	96± 3	4.8±0.2	540± 94	11.0±1.3	84±17	1.71±0.29	0.29±0.01	87.6±11.9
With cholesterol	one 3-hr. feeding beginning 3 weeks after weaning	female	387±12	98± 5	5.1±0.3	570±141	10.8±2.3	96±15	1.84±0.25	0.30±0.01	84.6±10.3
Experiment II—Autopsy Nine Weeks after Weaning											
Without cholesterol	*ad libitum*	male	911±43	287±20	9.9±0.6	493± 67	5.0±1.0	28±2.0	0.28±0.02	0.22±0.01	84.1± 2.5
Without cholesterol	two 1-hr. feeding periods daily	male	792±16	252± 9	8.2±0.3	340± 11	4.1±0.2	22±1.0	0.26±0.01	0.22±0.01	67.7± 5.1
With cholesterol	*ad libitum*	male	931±10	299± 6	14.0±1.4	2911±540	19.9±1.8	622±11	4.74±0.36	0.33±0.01	62.6± 8.4
With cholesterol	two 1-hr. feeding periods daily	male	706±17	216±10	9.8±0.8	1277±205	12.4±1.0	259±44	2.54±0.19	0.27±0.01	61.1± 4.4
Without cholesterol	*ad libitum*	female	747±16	190± 5	6.3±0.3	302± 13	4.8±0.4	15.4±0.08	0.25±0.01	0.24±0.02	76.3± 5.0
Without cholesterol	two 1-hr. feeding periods daily	female	673±13	166± 5	5.9±0.2	254± 13	4.3±0.2	15.1±0.07	0.25±0.01	0.23±0.02	79.9±19.0
With cholesterol	*ad libitum*	female	728±24	183± 7	6.9±0.3	812±130	11.6±1.3	238± 44	3.40±0.57	0.33±0.01	124.7±13.7
With cholesterol	two 1-hr. feeding periods daily	female	638±13	157± 5	6.2±0.2	561± 37	9.0±0.6	139± 17	2.20±0.24	0.30±0.01	155.7±21.3

*Standard error.

cholesterol. The data indicate that the rat tends to maintain a relatively constant level of free cholesterol in liver, which may, however, be related to the cholesterol content of the diet.

SERUM CHOLESTEROL

Serum cholesterol in males was somewhat decreased by overnight fasting, and not much further decreased by restriction of food intake. However, only in the case of the cholesterol-fed males did the change with overnight fasting approach significance.

Females had, as a rule, higher serum cholesterols than did males of the same groups. Only in females of the 3-hr. experiment were serum levels lowered by restriction of access to food. Even in this experiment, overnight fasting of the cholesterol-fed females resulted in high serum cholesterols. Females fed for two 1-hr. periods daily had higher mean

serum values than did their *ad libitum* controls. The variability within groups suggested that a hormone produced in different amounts at different stages of the estrus cycle might influence the level of serum cholesterol.

Absolute amounts of liver lipids and cholesterol in the rats on restricted food intake were evidently maintained in about the normal proportions to liver weights and body weights provided no cholesterol was fed. With diets rich in cholesterol, limitation of access to food resulted in a greater decrease in liver cholesterol storage than in growth. The cholesterol-fed rats in the nine-week experiment (two meals) attained nearly the same body weights as their controls, while their liver cholesterols remained remarkably low. Lowering of serum cholesterol by restriction of time of access to food was never of more than borderline significance. A considerable proportion of the cholesterol-fed females with limited access to food on the nine-week experiment had higher serum cholesterols that their controls. Probably the chief generalization which can be drawn from the study is that, when time of access to food is limited, storage of liver lipid and cholesterol in the growing rat is decreased to a greater extent than is weight gain.

Summary

A study of the effect of time limitation of access to food on weight gains, serum and liver lipids in young rats is reported. The effect of fasting overnight, of one 3-hr. feeding period per day, and of two 1-hr. feeding periods was studied. Part of each group of animals was fed *ad libitum* and part was restricted. Basal diets were uniform and adequate, except that half the rats in each group were given 1 per cent cholesterol. Weight gains were, in general, limited to about the extent that food intakes were limited. Total liver lipids and cholesterol in the restricted groups were disproportionately decreased, especially in the older animals fed cholesterol. Serum lipids and cholesterol were never greatly lowered and, in the case of females fed twice daily, were increased by time restriction of access to food.

References

(1) LYON, I., MASRI, M. S., AND CHAIKOFF, I. L.: Fasting and hepatic lipogenesis from C^{14} acetate. J. Biol. Chem. 196: 25, 1952.

(2) COCKBURN, R. M., AND VAN BRUGGEN, J. T.: Acetate metabolism *in vivo:* Effect of refeeding. J. Biol. Chem. 234: 431, 1959.

(3) EMERSON, R. J., BERNARDS, W. C., AND VAN BRUGGEN, J. T.: Acetate metabolism *in vitro:* Effect of refeeding. J. Biol. Chem. 234: 435, 1959.

(4) GRAM, M. R., AND OKEY, R.: Incorporation of acetate-2-C^{14} into liver and carcass lipids and cholesterol in biotin-deficient rats. J. Nutrition 64: 217, 1958.

(5) OKEY, R., LYMAN, M. M., HARRIS, A. G., EINSET, B., AND HAIN, W.: Dietary fat and cholesterol metabolism: Effects of unsaturation of dietary fats on liver and serum lipids. Metabolism 8: 241, 1959.

(6) OKEY, R., AND LYMAN, M. M.: Dietary fat and cholesterol metabolism. 1. Comparative effects of coconut and cottonseed oils at three levels of intake. J. Nutrition 61: 523, 1957.

(7) SPERRY, W. M., AND WEBB, M.: A revision of the Schoenheimer-Sperry method for cholesterol determination. J. Biol. Chem. 187: 97, 1950.

"The Under-Fed" in the United States

Some groups in the United States have not been able to participate in the general improvement in the American diet over the past decades. For example, there are approximately 370,000 American Indians living on reservations who, until quite recently, had a health status approximating that of this country sixty years ago. There are an estimated 750,000 U.S. citizens, and another 500,000 foreign nationals, who are dependent on migrant agricultural work for a living. Their incomes are low, uncertain and sporadic. Their morbidity rates are high, their diets precarious and poor.

Our cities, big and small, contain less favored socio-economic groups whose diets range from poor to totally inadequate. For example, in Washington, our nation's capital, about two hundred children are admitted to hospitals each year suffering from malnutrition. The unemployed, the partially employed, and welfare groups contain similar problems. Even among our general population, there are certain age-sex groups which pose special problems.

Older people are becoming an ever larger part of our population. Many of them are suffering from disabling illness and limited economic resources. Undernutrition is common even though outright deficiency disease is rare.

There are also an appreciable group of citizens who cannot attain a normal diet for a variety of medical reasons. Lastly, there is an appreciable group who do not consume an adequate diet due to nutrition fads and other mistaken notions about food.—*James M. Hundley, M.D., National Institutes of Health, Bethesda, Maryland, speaking before The Melamine Council, February 16, 1960.*

Magnesium in Beef, Eggs, Chicken, and Beef Gravy[1]

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ALTHOUGH MAGNESIUM is needed by the human body, a dietary allowance has not been suggested by the Food and Nutrition Board of the National Research Council. Magnesium is wide spread in plant and animal foods. Thus, it appears that a well balanced diet will contain at least 250 to 300 mg., the estimated requirement for adults per day. Data on the magnesium content of foods, however, are sparse.

Procedure

Eight raw and cooked samples of Utility grade beef round and heavy hens (6 to 7 lb. each), and eight cooked samples of eggs and beef gravy were obtained from the main kitchen of the State University of Iowa Hospitals. Pot roast of beef rounds were prepared in steam-jacketed kettles with preliminary browning of the meat; chickens were steamed; eggs were boiled. Beef gravy was made from pot roast drippings, diluted and thickened according to the bias of the cook in charge.

The Hernandez (1) modification of the Young and Gill method (2) was used for determining magnesium. In order to estimate the shrinkage of the meat samples during cooking, the nitrogen contents[2] of raw and cooked samples of beef and chicken were determined also, using the boric acid modification (3) of the Kjeldahl method.

Results

The average values for the magnesium and protein contents ($N \times 6.25$) of the analyzed samples are presented in Table 1.

The mean value for pot roast of beef of 18.4 mg. magnesium per 100 gm. cooked sample is slightly less than the averages reported by McCance and Shipp (4) and by McCance and Widdowson (5). The mean value for the magnesium content of stewed heavy hens is also lower than values previously reported in the literature (4-6). On the other hand, the average value of 13.1 mg. magnesium per 100 gm. cooked egg is similar to means reported by other investigators (4-6).

TABLE 1 Magnesium content of beef, eggs, chicken, and beef gravy, and protein content of beef and chicken

FOOD	MAGNESIUM		PROTEIN†
	Range	Mean*	
	mg./100 gm.	*mg./100 gm.*	*gm./100 gm.*
Beef—Utility grade round			
Raw	13.3–25.2	20.3±3.79	18.9
Cooked, pot roast	15.7–22.6	18.4±2.52	29.0
Eggs, boiled	8.9–18.5	13.1±2.84	—
Chicken—heavy hens			
Raw	16.6–27.8	23.2±4.34	20.6
Stewed	13.0–23.2	19.1±3.18	30.4
Beef gravy	11.3–35.0	25.3±7.85	—

*Mean plus standard deviation.
†Nitrogen × 6.25.

Gravy is prepared in the hospital kitchens by the same methods used for family cookery; that is, the meat drippings are diluted and thickened with wheat flour. Thus, a wide range of values might be expected for gravy; no data were found in the literature.

Leaching of magnesium from meat during cooking occurred. When the magnesium in cooked and raw samples of beef and chicken was compared on equal protein content, the differences in magnesium values were significant at the 1 per cent level as shown by the *t* test. In all cases, the values per gram

[1]Taken from a thesis submitted by Elizabeth Anne Fox in partial fulfillment of the requirements for the degree of Master of Science in nutrition. Received for publication August 25, 1959.

[2]The authors wish to acknowledge the assistance of Barbara Emison, Graduate Research Assistant, Nutrition Laboratory, in determining nitrogen in beef and chicken samples.

for the cooked samples were less than those for the corresponding raw samples. Neither cooking time nor ratio of water to meat were controlled in these studies. Thus, it was to be expected that these variables in the cooking process influenced the amount of magnesium leached from meat. However, the procedures are characteristic of institutional cookery for meat.

References

(1) HERNANDEZ, T. B.: Magnesium, calcium, and phosphorus utilization in normal subjects on two different levels of magnesium intake. State Univ. of Iowa Thesis, 1955.

(2) YOUNG, H. Y., AND GILL, R. F.: Determination of magnesium in plant tissue with thiazole yellow. Anal. Chem. 23: 751, 1951.

(3) SCALES, F. M., AND HARRISON, A. P.: Boric acid modification of the Kjeldahl method for crop and soil analysis. J. Indust. & Engin. Chem. 12: 350, 1920.

(4) MCCANCE, R. A., AND SHIPP, H. L.: The Chemistry of Flesh Foods and Their Losses on Cooking. Med. Res. Council, Spec. Rept. Series No. 187. London: H. M. Stationery Off., 1933.

(5) MCCANCE, R. A., AND WIDDOWSON, E. M.: Composition of Foods. Med. Res. Council, Spec. Rept. Series No. 235. London: H. M. Stationery Off., 1940.

(6) SHERMAN, H. C.: Chemistry of Food and Nutrition. 8th ed. N.Y.: Macmillan Co., 1952.

Frequency of Meals and Total Caloric Intake

The therapeutic dietitian is frequently confronted with the problem of providing adequately for the nutritional needs of the patient with marked anorexia that accompanies many debilitating diseases. Energy expenditures in patients with rapidly growing malignant neoplasms is an example (Cancer 4: 500, 1951). The usual procedure is to supplement the three regular meals with high-caloric, between-meal nourishments. At the Clinical Center, National Institutes of Health, a project was devised to learn whether offering food to this type of patient at more frequent intervals increases his total caloric intake or whether the patient compensates by eating less at each meal.

Six patients were studied for periods of fifteen to twenty days. Four were markedly underweight; two were of normal weight. Two equicaloric dietary regimens were calculated and compared; the foods in both regimens were arranged into six-meal and three-meal plans, which were alternated so that progression of the disease would not obscure comparison of the two diets.

The diets were purposely calculated to contain more food than the patients could consume, and the patients were told to eat as much as they wanted but were not expected to consume all food offered. All food that was served was weighed. Food refused was reweighed. Caloric intakes of each patient were calculated daily, using standard food composition tables.

The results of this study suggest that it *is* possible to increase total caloric intake appreciably in the markedly debilitated patient by offering food at more frequent intervals. Five patients increased their caloric intakes on the six-meal regimen; increases ranged from 440 to 550 calories per day as compared with the three-meal plan. One patient showed no significant difference. Protein intakes also increased.

The undernourished patient who is not in energy equilibrium has diminished hunger sensations; he no longer is stimulated to consume sufficient calories to meet his energy deficit. It appears that the motions of eating in these patients can only be endured for relatively short periods of time and that caloric intakes increase with the number of opportunities to eat and not with the total amount of food offered at one time.

These results are presented, not as conclusive evidence, but as a means of providing additional information toward determining the extent to which frequency of feedings may increase total caloric consumption.—*Contributed by Barbara H. Dennis, Assistant Dietitian, and Ann Reimer, Senior Dietitian, Chief, Patient Dietetic Services, Nutrition Department, Clinical Center, National Institutes of Health, Bethesda, Maryland.*

Metabolic Responses of Young Women While Reducing[1]

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DESPITE DIETARY intakes generally considered adequate in all the nutrients except calories, the weight loss in obese young men and women is often accompanied by apparently adverse metabolic responses (1-12). These responses consist of nitrogen, calcium, and/or phosphorus deficits. From a recent study, it seems clear that nitrogen losses in some subjects are characteristic of caloric restriction *per se* (12). Since not all subjects respond metabolically in a uniform manner to weight loss, there has been question as to what leads to negative balances in some and not in others. The factor seemingly most closely related has been the total pounds lost during the experiment (11).

The authors have felt nitrogen balance during weight reduction might be related to the degree of fatness of the body; and that possibly those going into nitrogen deficit were those who were more overweight than over-fat or obese (12). Ohlson *et al.* (13) have suggested that one of the basic needs for research in weight reduction is in the body composition of the overweight person as it relates to the metabolic response observed. Recently Young *et al.* (12) reported that the sum of fat pad thicknesses measured on soft tissue X-rays at five locations on the body appeared to be related to the ability of young women to stay in nitrogen equilibrium during caloric restriction.

At that time, no more precise method of measuring relative body fatness was available in our laboratory. In the meantime, equipment to determine the percentage of body fat by densitometry has been installed. The present study was undertaken to relate the relative body fatness of overweight young women to their nitrogen metabolism during caloric restriction and consequent weight loss. There are no data in the literature relating the densiometrically determined percentage of body fat of young women to their weight losses or to concurrent metabolic responses during caloric restriction.

Procedure

This investigation represents an effort to relate the body fatness of nine overweight young women to their nitrogen metabolism during weight reduction. Metabolic responses to calcium and phosphorus were studied concurrently but are not reported here.

A sixteen-week experimental period was divided into a four-week pre-reducing weight maintenance period followed by a twelve-week reducing period. All subjects ate weighed diets adequate in all nutrients except calories during the reducing period. At the third or fourth week of pre-reduction, the sixth or seventh and the eleventh weeks of weight reduction, nitrogen loss or storage was determined by the balance technique using seven-day collection periods. Hydrostatic weighings to determine body density, and hence an estimation of percentage of body fat, were planned for the same stages of the experiment.

SUBJECTS

The nine overweight young women ranged in age from eighteen through twenty-one years. Initially their excess weight varied from 13.8 to 43.6 per cent, with an average of 26.4 per cent according to the Baldwin and Wood standards given in MacLeod and Taylor (14). Mean excess weight was 35.4 lb. The women lived in the usual dormitory or sorority sit-

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uations except that meals were eaten at a Special Diet Table operated by the Graduate School of Nutrition instead of in the dormitory dining halls. Subjects were carefully screened by interview and by psychologic testing so that only those were chosen who appeared to be sufficiently stable emotionally to cooperate in a sixteen-week controlled feeding period (15). A description of the subjects and their weight changes during the experiment is given in Table 1. Each morning before breakfast, the subjects weighed themselves wearing their light indoor clothing but without shoes. The accuracy was checked from time to time by the dietitian.

DIETS

Throughout the sixteen weeks, the subjects ate weighed diets except for a ten-day Easter recess during which they were given instructions concerning the reducing diet to be followed at home. At the Special Diet Table, dietitians supervised the preparation and service of food and assisted in its weighing. They also ate with the subjects and kept careful records of their observations during the meals.

A dietitian planned and calculated the menus which were rotated on a weekly basis. During the reducing period, the daily diets were calculated to contain 90 gm. protein, 1 gm. calcium, and 1.5 gm. phosphorus and to meet the Recommended Dietary Allowances in other nutrients (16, 17) except for calories. Water, clear tea and coffee, and salt were allowed *ad libitum*, although fluid intakes were recorded and sampled during collection periods.

The basic diet for the weight maintenance period provided 2400 calories, 126 gm. fat, and 225 gm. carbohydrate. The caloric level was adjusted to the individual energy requirements by adding or deleting relatively pure carbohydrates and fats, such as sugar, butter, and oils. During weight reduction, a 1400-calorie, moderate-fat, low-carbohydrate diet was used consisting of 90 gm. protein, 80 gm. fat, and 80 gm. carbohydrate.

BALANCE STUDY TECHNIQUES

Complete collections of feces, urine, and food were made for seven-day periods at three stages of the experiment as outlined above. The first balance in the pre-reducing weight maintenance period enabled each subject to serve as her own control in the two later balance periods while calories were restricted. Urine samples were collected for seven consecutive days on a 24-hr. basis with toluene as a preservative. Volume was measured daily and a 1/10 aliquot saved for pooling and digest with 2:1 hydrochloric acid.

Stools were marked by carmine. They were collected in Cellophane-lined containers and saved from the first appearance of the carmine until the appearance of the second marker. They were weighed, frozen, and later digested on the steam-bath with 2:1 hydrochloric acid. The mixture was made up to standard volume from which aliquots were removed for analysis.

Each portion of food served during the balance periods was weighed into a waxed cardboard freezing container which, when full, was placed in the freezer. To obtain a homogeneous slurry for the week, samples were thawed, pooled, ground, mixed, weighed, and aliquots taken. These were digested on the steam bath with 2:1 hydrochloric acid and made up to volume for later analyses. The nitrogen of urine, feces, and food aliquots were determined by the macro-Kjeldahl method (18).

DENSITOMETRY

The fat content of the body was estimated by the densitometric technique of Behnke *et al.* (19, 20) which has been perfected by Brozek and associates (21). A correction was made for the volume of residual air in the lungs at the moment of weighing by employing the open-circuit nitrogen dilution method of Cournand and co-workers (22) as modified by the Minnesota group (23). For the purposes of calculation of body fat from density, the Rathbun and Pace formula was used (24, 25).

The apparatus used consisted of a large cement tank filled with water at 37° $\pm$ 1°C. From an electric hoist was suspended a 20-kg. scale calibrated to 20 gm. and suspended from this was an aluminum chair. By means of a snorkel connected with a series of tubes and valves, the subject could breathe either room air or inspire oxygen from a spirometer and expire into a Tissot spirometer. The oxygen from the storage tank was saturated with water vapor before being fed into the spirometer.

Subjects were taken in a postabsorptive state first thing in the morning. They wore very brief sun-back Helanca stretch nylon leotards and a standard tight-fitting bathing cap pulled well on to the head to exclude air.

For the initial stages of the hydrostatic weighing, the valve of the snorkel tube was turned to allow the breathing of room air. The Tissot gasometer and connecting tubes were flushed six times with 6 liters oxygen each time. Following a preliminary instruction period, the subject was seated in the weighing chair, secured with the attached safety belt, and connected with the snorkel device by means of a rubber mouthpiece and nostrils closed with a nose-clip. Trial weighings were made at the end of an expiration with the breath held when the subject was fully submerged in the water. When the underwater weights read to the nearest 100 gm. checked on three successive trials, the subject was considered "trained." On the final submersion, at the moment the weight was taken, the valve of the snorkel was turned by remote control to allow the in-

TABLE 1 **Description of subjects and weight changes during study**

SUBJECT	AGE	HEIGHT	INITIAL WEIGHT	INITIAL EXCESS WEIGHT		WEIGHT LOSS	EXCESS WEIGHT LOST	AVERAGE WEEKLY WEIGHT LOSS	WEIGHT CHANGES BY PERIOD				
				Actual	Per cent				Pre-reducing—Feb. 10–March 9	Reducing: March 10–28	Reducing: Vacation—March 29–April 6	Reducing: April 7–May 4	Reducing: May 4–31
	yr.	*in.*	*lb.*	*lb.*		*lb.*	*%*	*lb.*	*lb./week*	*lb./week*	*lb./week*	*lb./week*	*lb./week*
1	16	63.25	168.0	51.0	43.6	20.5	40.2	1.7	−0.12	−2.9	+1.4	−2.44	−1.25
2	19	69.0	167.25	25.25	17.8	19.0	75.2	1.4	−0.56	−2.8	+2.8	−2.5	−0.88
3	21	64.25	154.25	26.25	20.5	17.25	65.7	1.5	+0.19	−3.0	+0.7	−1.5	−1.1
4	19	61.0	132.0	16.0	13.8	8.5	53.1	0.8	+0.25	−2.2	+0.7	−1.4	−0.1
5	21	64.5	147.75	22.75	18.2	5.5	24.2	0.5	+0.12	−1.3	+4.2	−1.6	−0.63
6	19.5	71.5	191.5	41.5	27.7	32.5	78.3	2.5	−0.63	−3.8	+3.5	−4.1	−2.3
7	21	71.0	218.5	63.5	41.0	24.5	38.6	2.0	−0.87	−3.6	+1.9	−2.3	−1.4
8	18	64.0	153.0	30.0	24.4	17.75	59.2	1.4	−0.38	−3.0	+5.6	−3.25	−0.9
9	20	67.5	182.75	42.75	30.5	20.0	46.7	1.5	−0.62	−2.8	+1.9	−2.1	−1.2
Mean...	19.4	66.2	168.3	35.4	26.4	18.4	53.5	1.5	−0.3	−2.8	+2.52	−2.2	−1.1

halation of oxygen from the spirometer and the exhalation into the Tissot gasometer. The chair was then raised so that the subject's head was above the water level and she breathed oxygen for 7 min. Later, the underwater weight of the empty chair was obtained by lowering it to exactly the same depth as reached when weighing the subject. After the gas in the gasometer had been thoroughly mixed, samples were withdrawn for nitrogen analysis in a Thomas-Van Slyke Manometric apparatus. The analytical procedure of Peters and Van Slyke (26) was used.

In the initial design of the experiment, it was proposed to determine the percentages of body fat at the time of the balance studies in the pre-reducing, maintenance period and during the reducing period. Due to installation difficulties beyond the authors' control, it was impossible to use the equipment and thereby "iron out the wrinkles" in its manipulation prior to the first measurements. For the same reason, the initial baseline measurements were made at a later date than intended, sometimes extending into the reducing period. It is certain that the technical difficulties involved in gaining experience with the equipment are reflected in the values of body fat which will be presented. Although the confidence in the precision of these data may be limited, they do give an estimate of the relative fatness of the subjects which we believe are better for judging the degree of obesity than are the estimates of excess weight gained by comparisons with Baldwin and Wood standard weights (14). They cannot be assigned the precision given the body fat estimations made after greater experience with the equipment had been obtained. For this reason, some relationships which we had planned to examine in detail were omitted, but will be studied in the future.

QUESTIONNAIRE

As has been our practice, on completion of the experiment, the subjects were asked to fill out questionnaires concerning their reactions to the study, previous food habits, and any unreported deviations from the diet or collection procedures.

Results and Discussion

WEIGHT CHANGES

In Table 1 are given the weight losses of the subjects in terms of total pounds lost, percentage of excess weight lost, average weight loss per week for the over-all experiment, as well as for various phases of the study. Over the sixteen weeks, four of which were designed to be on maintenance calories, the subjects lost 24.2 to 78.3 per cent of their calculated initial excess weight. The average for the group was 53.5 per cent and corresponded to a mean loss of 18.4 lb., a median of 19.0 lb. In general, the initially heavier subjects lost the most.

During the four-week pre-reducing weight maintenance period caloric intakes were varied for each individual in an attempt to stabilize her weight. Energy levels of the diets varied from 2400 to 2900 calories per day with a mean intake of 2602 for all subjects. Adjustments were not perfect, and small weight fluctuations occurred. The mean variation for four weeks was —1.2 lb., or —0.37 lb. per week. If the mean maintenance calories are adjusted for this small weight loss, the mean maintenance calories would become 2753 per day; the median, 2760. These figures are interesting in view of the mean body weight of 168.3 lb. or 76.5 kg. The suggested caloric allowance for women at twenty-five years and 75 kg., according to the Recommended Dietary Allowances (17), is 2750. Of course, in the subjects studied here, not all of the weight is "desirable" weight.

As reported previously, on a constant caloric restriction weight loss occurs at a decreasing rate as the reducing period continues. In the nearly three-week reducing period before spring vacation, the

TABLE 2 **Weight changes related to initiation of moderate-fat reducing diet**

SUBJECT	WEIGHT CHANGES				
	Reducing period		10-day vacation period	Post-vacation reducing period	
	Week I	Week II		Week I	Week II
	lb.	*lb.*	*lb.*	*lb.*	*lb.*
1	−3.25	−1.50	+2.0	−4.75	+0.5
2	−5.0	−0.5	+4.0	−4.25	−2.75
3	−4.0	−2.5	+1.0	−1.0	−2.5
4	−3.0	−2.0	+1.0	−0.5	−2.0
5	−4.0	−1.25	+6.0	−5.25	−1.5
6	−2.5	−5.25	+5.0	−4.5	−3.75
7	−4.5	−2.75	+2.75	−4.0	−1.0
8	−4.0	−2.25	+8.0	−8.0	−2.5
9	−1.0	−4.25	+2.75	−2.25	−2.5
Mean.....	−3.25	−2.5	+3.61	−3.83	−2.11
Median....	−4.0	−2.25	+2.75	−4.25	−2.5

mean loss was 2.8 lb. per person per week. In the four-week period following vacation, the mean rate had dropped to 2.2 lb. per week and in the succeeding four-week period, to 1.1 lb. per week. (Table 1). In clinic studies, decrease in rate of weight loss is often assigned to lack of co-operation. In some cases, of course, this is the case; however, even on constant caloric intake, the rate does decrease and psychologically is a factor to be reckoned with in handling reducing patients. The decrease may be attributed, at least in part, to a small decrease in the 24-hr. basal energy requirements frequently reported during weight reduction (1, 5, 7, 9, 10, 12), to the lowered energy requirement for activity incident to the lower body weight, to the diminishing activity often noted among the subjects, and possibly also to a physiologic adaptation.

Though the subjects were instructed to follow the reducing diet during the ten-day vacation period, it is obvious that most did not succeed too well. Some of the weight increases were so large as to seem impossible. We have observed, and Fryer *et al.* (27) have reported, marked increases in weight during a holiday period which often is compensated for by relatively large losses on return to the previous controlled reducing regimen. It seems likely that water retention and subsequent water losses occur in shifts to and from the moderate-fat diet. In Table 2 are given the weight changes related to the initiation of the moderate-fat diet. Here the weight losses in the first week of the moderate-fat reducing diet are compared with those in the second week; the weight gains during vacation are listed and then a comparison of the weight losses resulting from a reinstitution of the moderate-fat diet in the first and the second weeks after vacation. In most cases, losses during the weeks following the transition to the moderate-fat diet were larger than those of succeeding weeks; the medians for the first week in each case being 4.0 and 4.25 lb. for the second weeks, 2.25 and 2.5 lb. respectively.

The weight pattern of Subject No. 5 deserves special attention. During the pre-reducing weight maintenance period on a dietary intake averaging 2571 calories, she gained 0.5 lb. in four weeks. Yet while on the reducing regimen, she showed a net loss of only 5.5 lb. Though she gained 6.0 lb. during vacation, 5.25 lb. were lost in the week immediately following. One might think she "over-stepped" the reducing diet. However, no confirmation of this possibility could be elicited, either by direct or indirect questioning. She did exhibit lethargy and inactivity which the others frequently mentioned.

NITROGEN METABOLISM

The mean daily retentions of nitrogen for the three seven-day balance periods are given in Table 3. Only retentions or losses greater than 5 per cent of intake were considered significant. During the pre-reducing weight maintenance period, on an intake of 13.52 to 13.72 gm. nitrogen, eight of the nine subjects retained appreciable amounts of nitrogen while the ninth subject (No. 3) was in a state of nitrogen equilibrium. After about six weeks on a reducing regimen providing 13.52 to 13.83 gm. nitrogen, five subjects were losing nitrogen, three were in balance, and one was still storing it. At the end of the reducing period, on an intake of 14.43 gm. nitrogen, five subjects were again retaining nitrogen, three were losing nitrogen, and one was in equilibrium. Four subjects (Nos. 1, 4, 6, and 9) were not in nitrogen deficit at any time during the experimental period.

In the pre-reducing obese state, the subjects excreted a mean of 78.68 per cent of their nitrogen intake in the urine and 7.31 per cent in the feces. By the sixth or seventh week of the reducing period, the average urinary output had increased to 99.86 per cent of intake and fecal output had decreased to 4.26 per cent. Relatively small decreases were ob-

TABLE 3 **Mean daily retentions of nitrogen**

SUBJECT	NITROGEN BALANCE		
	Period I—3rd or 4th week of pre-reducing maintenance (intake of 13.52 to 13.72 gm. nitrogen daily)	Period II—6th or 7th week of reducing regimen (intake of 13.52 to 13.83 gm. nitrogen daily)	Period III—11th week of reducing regimen (intake of 14.43 gm. nitrogen daily)
	gm./day	*gm./day*	*gm./day*
1	+2.294—R*	+0.055—B†	+2.445—R#
2	+2.316—R	−1.718—L‡#	−0.027—B
3	+0.665—B	−1.409—L	−0.764—L
4	+1.422—R	−0.396—B	+1.332—R
5	+2.657—R	−1.285—L	−0.850—L
6	+2.524—R	−0.038—B	+2.101—R
7	+1.938—R	−1.361—L	−2.300—L
8	+1.135—R	−0.941—L	+1.153—R
9	+2.218—R	+2.025—R	+1.253—R
Subjects retaining nitrogen.....	8	1	5
Subjects in nitrogen balance....	1	3	1
Subjects losing nitrogen.....	0	5	3

*Retention greater than 5% of intake.
†Balance: retention or loss less than 5% of intake.
‡Loss greater than 5% of intake.
#Stool values either markedly higher or lower than other values for same subject; may have indicated difficulty in accurate stool marking.

served in both urinary (93.52) and fecal (3.14) nitrogen expressed as percentage of the intake during the last weeks of caloric restriction. It will be remembered that though calculated to be the same as intake in the previous periods, the analyzed values for nitrogen were slightly higher during this period.

BODY FAT

As indicated earlier, due to installation difficulties, it was impossible to use the densitometric equipment prior to the first measurements, and these had to be delayed until later than intended, sometimes extending into the reducing period. The mean percentage of body fat measured early in the experiment was 35.77; that measured during or near the second balance period, 31.45; and at the time of the last balance period, 29.19. The mean net change in body fat content was 6.58 per cent. When the data were plotted, no correlations were apparent between these changes and gross weight losses.

When the nitrogen retention figures were examined in relation to the apparent percentage of body fat at various stages of the experiment, no real support could be found for a relationship between the two. Two of the three subjects (Nos. 7 and 5) who were in nitrogen deficit during both reducing balance periods were highest in percentage body fat at all three times of measurement. Even at the end of the experiment, their body fat content was considerably above that of normal young women as judged by the limited values available for comparative purposes. The subject with the lowest percentage of body fat at the end of the experiment (No. 1) was retaining nitrogen and never did go into nitrogen deficit. Comparisons of the final percentage of body fat, the nitrogen retentions in the last reducing balance period, and net weight losses by rank order of subjects are given in Table 4. The possible inverse relationship which might exist between nitrogen retention and net weight loss does not seem to be indicated in these data.

TABLE 4 **Relation between percentage of body fat, nitrogen balance, and net weight lost**

SUBJECT	FINAL BODY FAT		NITROGEN BALANCE, Period III		NET WEIGHT LOSS	
	Per cent	Rank order	Retention	Rank order	Actual	Rank order
			gm./day		*lb.*	
1	24.04	9	2.45—R*	1	20.5	3
2	25.25	7	−0.03—B†	6	19.0	5
3	24.61	8	−0.76—L‡	7	17.25	7
4	32.26	3	1.33—R	3	8.5	8
5	37.08	1	−0.85—L	8	5.5	9
6	25.32	6	2.10—R	2	32.5	1
7	34.64	2	−2.30—L	9	24.5	2
8	28.24	5	1.15—R	5	17.75	6
9	31.28	4	1.25—R	4	20.0	4

*Retention greater than 5% of intake.
†Balance—retention or loss less than 5% of intake.
‡Loss greater than 5% of intake.

Now, with greater experience with the densitometry, we should like to repeat these experiments with subjects of greater divergence in body fatness. With more precise figures, the specific gravity of the tissues lost could be calculated and related to the nitrogen metabolism.

Summary

A study was undertaken to investigate: (a) the effect of weight loss on the nitrogen metabolism of obese young college women; (b) the concomitant changes in the amount of body fat as measured by densitometry; (c) the relation between the nitrogen metabolism and the percentage of body fat.

Nine college women 16.0 to 63.5 lb. overweight were studied for four weeks on a weight maintenance diet and for twelve weeks on a 1400-calorie reducing diet, calculated to provide 14.4 gm. nitrogen.

Nitrogen balance studies were made before, halfway through, and at the end of the twelve-week reducing period. Specific gravity determinations were conducted at approximately the same stages of the experiment.

The mean weight loss was 18.4 lb. The rate of loss decreased as caloric restriction continued.

During the pre-reducing weight maintenance period, eight of the nine subjects were in positive nitrogen balance, while the ninth was in equilibrium. Throughout the rest of the experiment, four subjects remained in nitrogen retention or equilibrium. By the sixth or seventh week of reduction, five subjects were losing appreciable amounts of nitrogen. By the eleventh week, two of these subjects had regained a state of balance or retention; three remained in nitrogen deficit.

Early in the experiment, the percentages of body fat for the group ranged from 31.14 to 43.98, with a mean of 35.77. Toward the end, the percentages had decreased to a mean of 29.19, with a range of 24.04 to 37.08. An association between the degree of fatness and the tendency to remain in nitrogen balance was not apparent.

References

(1) BROWN, E. G., AND OHLSON, M. A.: Weight reduction of obese women of college age. 1. Clinical results and basal metabolism. J. Am. Dietet. A. 22: 849, 1946.

(2) BROWN, E. G., HERMAN, C., AND OHLSON, M. A.: Weight reduction of obese women of college age. 2. Nitrogen, calcium, and phosphorus retentions of young women during weight reduction. J. Am. Dietet. A. 22: 858, 1946.

(3) LEVERTON, R. M., AND RHODES, H. N.: Nitrogen calcium, phosphorus, and basal energy metabolism of obese college women during weight reduction. J. Am. Dietet. A. 25: 1012, 1949.

(4) LEVERTON, R. M., AND GRAM, M. R.: Further studies of obese young women during weight reduction. Calcium, phosphorus, and nitrogen metabolism. J. Am. Dietet. A. 27: 480, 1951.

(5) CEDERQUIST, D. C., BREWER, W. D., BEEGLE, R. M., WAGONER, A. N., DUNSING, D., AND OHLSON, M. A.: Weight reduction on low-fat and low-carbohydrate diets. 1. Clinical results and energy metabolism. J. Am. Dietet. A. 28: 113, 1952.

(6) BREWER, W. D., CEDERQUIST, D. C., WILLIAMS, B., BEEGLE, R. M., DUNSING, D., KELLEY, A. L., AND OHLSON, M. A.: Weight reduction on low-fat, low-carbohydrate diets. 2. Utilization of nitrogen and calcium. J. Am. Dietet. A. 28: 213, 1952.

(7) YOUNG, C. M.: Weight reduction using a moderate-fat diet. 1. Clinical responses and energy metabolism. J. Am. Dietet. A. 28: 410, 1952.

(8) YOUNG, C. M.: Weight reduction using a moderate-fat diet. 2. Biochemical responses. J. Am. Dietet. A. 28: 529, 1952.

(9) YOUNG, C. M., RINGLER, I., AND GREER, B. J.: Reducing and post-reducing maintenance on the moderate-fat diet. Metabolic studies. J. Am. Dietet. A. 29: 890, 1953.

(10) YOUNG, C. M., EMPEY, E. L., SERRAON, V. U., AND PIERCE, Z. H.: Weight reduction in obese young men. Metabolic studies. J. Nutrition 61: 437, 1957.

(11) YOUNG, C. M., BROWN, A. M., EMPEY, E. L., AND TURK, D.: Stepwise weight reduction in obese young men: Nitrogen, calcium and phosphorus balances. J. Nutrition 64: 203, 1958.

(12) YOUNG, C. M., BROWN, A. M., GEHRING, B. A., AND MORRIS, B. M.: Stepwise weight reduction in obese young women: Clinical and metabolic responses. J. Nutrition, in press.

(13) OHLSON, M. A., BREWER, W. D., KERELUK, D., WAGONER, A., AND CEDERQUIST, D. C.: Weight control through nutritionally adequate diets. *In* Weight Control—A Collection of Papers Presented at the Weight Control Colloquium—Iowa State College. Ames, Iowa: Iowa State College Press, 1955, p. 170.

(14) MACLEOD, G., AND TAYLOR, C. M.: Rose's Foundations of Nutrition. 4th ed. N.Y.: Macmillan Co., 1944, p. 570.

(15) SUMMERSKILL, J., AND DARLING, C. D.: Emotional adjustment and dieting performance. J. Consult. Psychol. 19: 151, 1955.

(16) WATT, B. K., AND MERRILL, A. L.: Composition of Foods—Raw, Processed, Prepared. USDA Agric. Handbook No. 8, 1950.

(17) FOOD & NUTRITION BD.: Recommended Dietary Allowances, Revised 1953. Natl. Acad. Sci.—Natl. Research Council Pub. 302, 1953.

(18) HAWK, P. B., OSER, B. L., AND SUMMERSON, W. H.: Practical Physiological Chemistry. 12th ed. N.Y.: Blakiston Co., 1947, p. 814.

(19) BEHNKE, A. R., JR., FEEN, B. G., AND WELHAM, W. C.: The specific gravity of healthy men. Body weight÷volume as an index of obesity. J.A.M.A. 118: 495, 1942.

(20) WELHAM, W. C., AND BEHNKE, A. R., JR.: The specific gravity of healthy men. Body weight ÷volume and other physical characteristics of exceptional athletes and of naval personnel. J.A.M.A. 118: 498, 1942.

(21) BROZEK, J., HENSCHEL, A., AND KEYS, A.: Effect of submersion in water on the volume of residual air in man. J. Appl. Physiol. 2: 240, 1949.

(22) COURNAND, A., BALDWIN, E. DEF., DARLING, R. C., AND RICHARDS, D. W., JR.: Studies on intrapulmonary mixture of gases. 4. The significance of the pulmonary emptying rate and a simplified open circuit measurement of residual air. J. Clin. Invest. 20: 681, 1941.

(23) CARLSON, W.: Personal communication, 1957.

(24) RATHBUN, E. N., AND PACE, N.: Studies on body composition. 1. The determination of total body fat by means of the body specific gravity. J. Biol. Chem. 158: 667, 1945.

(25) MORALES, M. F., RATHBUN, E. N., SMITH, R. E., AND PACE, N.: Studies on body composition. 2. Theoretical considerations regarding the major body tissue components, with suggestions for application to man. J. Biol. Chem. 158: 677, 1945.

(26) PETERS, J. P., AND VAN SLYKE, D. D.: Quantitative Clinical Chemistry. Vol. II. Methods. Rep. 1956. Baltimore: Williams & Wilkins Co., 1932, p. 106, 267.

(27) FRYER, J. H., MOORE, N. S., WILLIAMS, H. H., AND YOUNG, C. M.: Satiety values of isocaloric diets for reducing with special reference to the glucostatic theory of appetite control. J. Am. Dietet. A. 31: 868, 1955.

Some Problems in Collecting Dietary Data from Individuals[1]

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How-to-do-it is of great concern to nutritionists making dietary surveys in connection with medical investigations. In this article, the author provides new data on the effect on dietary findings of time, week-to-week, and collection method, record vs. recall.

PLANNERS OF studies of the diets of individuals must make several important methodologic decisions. Two questions at the top of the list are: How long a period is needed? What is the best way to obtain the information wanted?

Reports cited at the end of this article indicate that answers have been sought by several investigators (1-12). However, more observations are needed for guidance in determining the time period and method to use in terms of the specific objectives of a study. In studies of relationships between diets and signs of health among individual persons, the procedures to use probably would differ from those in a survey in which relationships among groups in the population are being sought.

To add to knowledge on these problems, methodologic explorations were included in a study of the food intakes of a small group of business and professional men in Minneapolis-St. Paul during the winters of 1953 and 1954. The men were selected from a larger group of volunteers in a long-term study of cardiovascular disease at the Laboratory of Physiological Hygiene of the University of Minnesota's College of Medical Sciences (13).

In 1953, thirty-nine men weighed and recorded the food they actually ate for two consecutive weeks. Thus it is possible to compare the data on intake and nutritive value of food provided by records for the first week and second week separately, and for one-week and two-week periods.

In 1954, fifty-nine other men recalled their food intakes during the last seven days (the last twenty-one regular meals) in response to questioning by an interviewer. For the next seven days, they weighed and recorded their intakes of food. This permitted comparison of the food which subjects recorded at eating time with that which they recalled eating during the preceding week.

Differences found in comparisons for nutrients have been tested for significance[2].

Method

The quality of the data from a dietary study depends greatly on the ability of both participants and interviewers and the understanding and care with which they perform their duties. In this study, great credit is due the participants and interviewers for both fulfilled their functions well.

The educational level of the men was high as indicated by some of their occupations—physician, dentist, pharmacist, lawyer, university professor, college dean, and business administrator. Reason for the study and the importance of accurate and complete reporting of food intake was readily communicated to the subjects. As volunteers in a long-time, well publicized study of aging, the men were aware of their contribution to science and were desirous of doing a good job as the "guinea pigs" they often termed themselves. Their wives shared responsibilities and were also able and cooperative.

Each man and wife was carefully instructed in his or her respective duties as subject and recorder by an interviewer. Nutritionists and a home economist on the staffs of the Household Economics and Human Nutrition Research Divisions served as interviewers[3]. All had had experience in earlier col-

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[2]Significance of data has been tested statistically and evaluated by Evelyn Grossman, Mathematical Statistician, Household Economics Research Division.

[3]Interviewers: nutritionists—Myrtle Brown, Norma Dillard, Berta Friend, Harriet Wright; home economist—Minnie Belle McIntosh.

TABLE 1 Average food intakes of business and professional men in two consecutive weeks as reported on records in 1953 and on recalls and records for 1954

FOOD GROUP OR ITEM	FOOD INTAKE PER MAN*					
	1953			1954		
	Both weeks	1st week records	2nd week records	Both weeks	1st week recalls	2nd week records
	gm./week	*gm./week*	*gm./week*	*gm./week*	*gm./week*	*gm./week*
Dairy products						
Fluid milk						
Whole	1687	1712	1663	1552	1533	1571
Skim and buttermilk	1033	1015	1051	934	870	997
Total	2720	2727	2714	2486	2403	2568
Cream	171	160	182	210	201	218
Cheese						
Cottage	48	40	57	49	43	55
Other	71	77	66	76	90	61
Total fluid milk equivalent, calcium basis†	3290	3318	3270	3117	3103	3123
Meat, poultry, and fish						
Meat	927	948	905	1031	1140	922
Poultry	130	126	134	202	158	245
Fish	205	223	188	228	240	215
Total‡	1262	1297	1227	1461	1538	1382
Eggs#	416	415	417	424	437	412
Fats and oil						
Butter and margarine	416	212	201	206	184	227
Lard and bacon drippings	88	90	85	76	79	73
Vegetable fat	87	85	90	102	103	102
Oil	45	42	47	50	50	49
Total‖	416	429	423	434	416	451
Vegetables and fruit						
Dark green vegetables	241	252	231	209	207	211
Deep yellow vegetables	79	81	77	92	79	106
Citrus fruit	804	859	749	1236	1425	1046
Tomatoes	306	322	289	265	260	270
White potatoes	509	558	460	520	494	545
Dry beans and peas and nuts¶	150	133	166	98	99	97
Other	1207	1212	1204	1401	1249	1553
Total**	3296	3417	3176	3821	3813	3828
Grain products						
Bread	645	651	640	620	596	643
Other baked goods	921	889	952	900	938	862
Cereals and pastes	343	344	341	342	333	350
Total grain equivalent ††	1384	1363	1403	1355	1356	1354
Sugars and sweet spreads‡‡	402	382	421	440	425	456
Alcoholic beverages						
Beer	964	932	995	330	348	313
Wine	39	18	60	38	40	35
Whiskey	215	217	212	146	154	139
Total	1218	1167	1267	514	542	487

*Amount served less any edible parts left on plate. Includes weight of any inedible fat, gristle, and bone that was an integral part of chops and other meat, poultry, and fish and of any skins, seeds, and cores of grapefruit, apples, and other fruits served in purchase form. Weights of commercially and home-made mixtures of more than one food have been allocated to component foods. Weights of component foods in commercially prepared foods have been estimated.

†Includes dry milk (reconstituted to fluid milk), fluid milk, and other milk products in ice cream, baked goods, and other mixtures. Factors used in converting milk products to fluid whole milk in terms of calcium content: cream, 0.8; cottage cheese, 0.6; other cheese, 5.7.

‡Includes meat, poultry, and fish in mixtures.

#Includes eggs in baked goods and other mixtures.

‖Includes butter, other fat, and oil in baked goods and other mixtures.

¶Rehydrated weight; includes dry beans and peas, and nuts in mixtures; also cocoa and chocolate.

**Includes vegetables and fruit in mixtures.

††Includes weight of cereals added to two-thirds weight of baked goods and one-fifth weight of cooked mixtures, chiefly pastes or other grain products. (Cooked mixtures are not shown separately.)

‡‡Includes sugar in ice cream, candy, sherbet, puddings, and baked goods.

TABLE 2 Distribution of intakes of four types of food by relationships between first and second weeks, records vs. records in 1953 and recalls vs. records in 1954

INTAKES OF FIRST WEEK COMPARED WITH INTAKES OF SECOND WEEK	PER CENT OF RECORDS OR RECALLS			
	Meat*	Whole milk†	Fats and oils‡	Vegetables and fruits#
Records vs. records, 1953				
Less than 80% agreement	23	26	8	5
80 to 120% agreement	49	38	74	60
More than 120% agreement	28	36	18	35
Recalls vs. records, 1954				
Less than 80% agreement	22	34	32	19
80 to 120% agreement	32	34	51	57
More than 120% agreement	46	32	17	24

*Beef, veal, lamb, pork; excludes poultry and fish.
†Whole fluid milk only.
‡Fats and oils in commercially prepared products as well as those prepared at home.
#Excludes dry beans and peas and nuts.

lections of dietary information and were given intensive training in pretesting schedule forms and instructions used in this particular study.

INSTRUCTIONS FOR RECORD METHOD

The man and his wife chose a week during the study which was free of social or business commitments that might interfere with record-keeping. The subjects were urged to continue to eat at home and away from home as they would have if they had not been keeping food records. Wives were asked to serve the men food of the same kinds and amounts as usual.

Participants were instructed in the familiar setting of their own homes, for the most part in kitchens. Here, there was ready access to the foods and dishes which the interviewer used in demonstrating how to weigh, measure, and estimate amounts of food.

During the week in which the man's record was kept, the interviewer made about four visits to the home. At each visit, she saw the wife. The man was usually present at only the initial and final interviews which were held in the evening.

At the first visit, the interviewer instructed the man and his wife in the use of the spring scale (gram) which was left in the home for the duration of the record period. Careful explanations and demonstrations were also given of how to record the kind and amount of food on the prepared forms. The amount of food recorded as eaten was the amount served less any left on the plate that contained edible parts. Description of each food included its processed state at the time of weighing and eating and other information pertinent to estimating nutritive value; examples are: "pork and beans with tomato sauce, commercially canned," "sirloin steak with bone, trimmed of fat," and "orange with peel."

Food eaten at home was weighed. Beverages were sometimes measured in fluid ounces. Weighed amounts of sugar, butter, and similar items used frequently at the table in small bits were set aside in distinctive containers with blue stickers to remind family members that these were for personal use of the subject. From initial and final weights, the quantity used was determined. Recipes were obtained for food mixtures which were eaten several times during the record period or were unusual.

Amounts of food eaten away from home were estimated in cups or other familiar measures. Subjects were supplied with pocket-size record cards and with 6-in., clear plastic rulers to measure such foods as sliced meat, chops, or pie.

In 1953, when food records were kept for two consecutive weeks, the intensive over-all instruction given the couple at the beginning of the first week was not repeated. Thus interviewers usually made fewer visits during the second week. The recorder, of course, benefited from know-how gained through experience the second week.

INSTRUCTIONS FOR RECALL METHOD

As its name implies, memory was relied upon to obtain dietary information by recall. Assisted by their wives, the men reported to interviewers what foods they had eaten at meals and between meals during the preceding seven days. Sufficient description to assign foods proper nutritive values was obtained. All amounts were estimated in household measures or dimensions. Similar foods and household measures in the kitchen were useful models.

To help convince the couple that they could recall the man's food, breakfasts were usually obtained first. Breakfast is the simplest meal of the day, and for many it varies little from day to day. Between-meal snacks sometimes came next. The main dish was used as a key to other foods eaten at noon and evening meals. It was customary to start with the food eaten during the last 24-hr. period, usually easiest to recall, and work backwards.

Interviewers had long schooling and were skillful in helping a man and his wife remember and make estimates. Sometimes a man telephoned a business

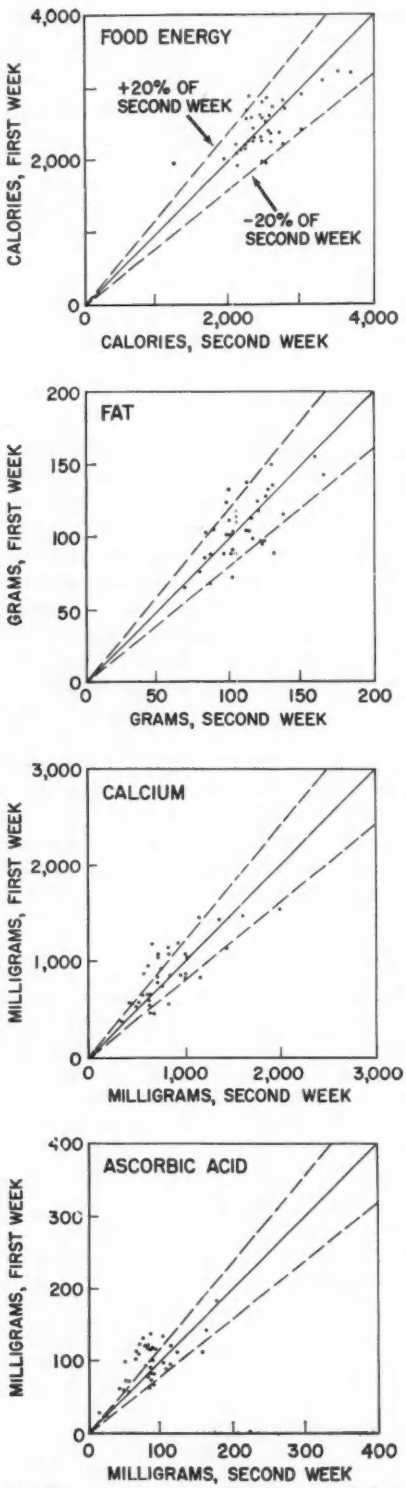

FIG. 1. *Record of first week vs. record for second week, comparing nutrients per day.*

associate to assist with the recall of the menu of a meal eaten together. A check list used toward the end of recall-taking aided in reminding the men of any forgotten foods, including snacks and accessories, such as butter, gravy, salad dressing, lemon, cream, and sugar.

Comparison of Records One- and Two-Week

FOOD INTAKES

Average amounts of groups of food eaten by the thirty-nine men who provided records for two consecutive weeks in 1953 were remarkably similar for both weeks (Table 1). Closer agreement would be expected for broad groups of food that are used daily than for sub-groups and separate items of food which usually are eaten only occasionally. Average intakes of most of the sub-groups and items, however differed surprisingly little.

Food selections of individuals are known to vary some from week to week. The extent of this variability fluctuates with people and their circumstances and in some places with season of year. In diets of many of these men, the amounts eaten of certain sub-groups and items of food during the first week were within $\pm$ 20 per cent of the amounts during the second week (Table 2). For example, more than 70 per cent of the men recorded intakes of fats and oils in the first week that were within $\pm$ 20 per cent of those in the next week. For some other foods, there were greater differences in intake from one week to the next. Agreement within $\pm$ 20 per cent between the two weeks for intakes of vegetables and fruit, meat, and whole fluid milk was encountered respectively for about 60, 50, and 40 per cent of the men.

NUTRIENT INTAKES

Average nutritive content of the food eaten by the thirty-nine men during the first and second weeks of the study also indicated the similarity between food practices during the separate weeks for the group as a whole (Table 3). The most substantial differences were found in vitamin A and ascorbic acid, which were about one-fifth higher the first week than the second. These higher values reflect the somewhat larger first-week intakes of dark green and deep yellow vegetables, citrus fruit, tomatoes, and potatoes. Intakes of these two vitamins would be expected to fluctuate from week to week because of their uneven distributions among vegetables, fruit, and other foods.

Standard deviations, for vitamin A, as for other nutrients, indicate, however, that dispersions around the means were similar in diets of the first and second weeks. Tests also show that differences between averages for groups of men were not significant in respect to any of the nutrients.

TABLE 3 Mean nutritive values* in two consecutive weeks of food intakes on records in 1953 and on recalls and records in 1954

TIME OF RECORD OR RECALL	FOOD ENERGY	PROTEIN	FAT	CALCIUM	IRON	VITAMIN A VALUE	THIAMINE	RIBOFLAVIN	NIACIN	ASCORBIC ACID
					1953					
	calories	*gm.*	*gm.*	*mg.*	*mg.*	*I. U.*	*mg.*	*mg.*	*mg.*	*mg.*
1st week records	2500 ±360†	93 ±16	107 ±22	900 ±300	13 ±2	8200 ±4600	1.2 ±0.2	2.0 ±0.6	17 ±4	98 ±33
2nd week records	2550 ±390	92 ±18	109 ±22	900 ±330	13 ±3	6800 ±4300	1.2 ±0.3	1.9 ±0.7	16 ±4	84 ±34
Both weeks	2520	93	108	900	13	7500	1.2	2.0	16	91
					1954					
1st week recalls	2490 ±460	99 ±23	109 ±25	900 ±350	14 ±3	8100 ±7100	1.2 ±0.3	2.1 ±0.8	17 ±4	110 ±53
2nd week records	2530 ±430	97 ±17	113 ±23	900 ±390	14 ±2	8400 ±5500	1.2 ±0.3	2.1 ±0.8	17 ±4	105 ±41
Both weeks	2510	98	111	900	14	8300	1.2	2.1	17	108

*Nutritive values derived from *Composition of Foods—Raw, Processed, Prepared* (14).
†Standard deviation.

As might be expected, the food intake of few of the men during the first week coincided exactly with that of their second week in terms of nutrients. Individual diets of some showed relatively little change from one week to the next; for others, diets in the two weeks were quite different.

Many agreed within ± 20 per cent, however (Figure 1). More than 90 per cent of the first-week diets came this close to second-week diets in food energy, about 80 per cent in fat, and 60 per cent in calcium. Ascorbic acid was the only nutrient studied in which fewer than half of the diets for the first week were within ± 20 per cent of those for the second week. Study of other nutrients (not illustrated) indicated that in protein, well over 80 per cent of intakes in the first week came within ± 20 per cent of those in the next week and in thiamine and riboflavin approximately 60 per cent.

Diets of the first week were somewhat more often below than above the second week in food energy. This reflected slightly lower intakes of several foods high in carbohydrate or fat—baked goods other than bread, dry beans and peas and nuts, sugars and sweet spreads, beer, and wine. Conversely, in all other nutrients, first-week diets, which were higher in vegetables and fruit, were more often above than below second-week diets.

Tests (based on paired differences) indicate that the daily intakes of calories and eight of nine nutrients in the diets of the individual men were not significantly different between the two weeks, considering the size of sample. The single exception was ascorbic acid; to evaluate the importance of its difference would take another study of the diets of these men or corroboration by other studies.

Comparison of Data from Recalls and Records

FOOD INTAKES

Averages for the amounts of food eaten by the fifty-nine men who both recalled and recorded their diets in 1954 are given in Table 1. Comparison indicates almost perfect agreement (within ± 1 or 2 per cent) for three main groups of food and close agreement (within about ± 10 per cent) in the averages for the other five groups.

Data in Table 1 also show close agreement between average intakes on records and recalls for some sub-groups and items of foods but wide divergence between those for others. For some foods, average intakes on recalls were higher and for other foods lower than on records.

Agreement was within ± 5 per cent for average intakes of fluid whole milk, vegetable fat, oil, dark green vegetables, tomatoes, dry beans and peas and nuts, and cereals and pastes. It was within about ± 10 per cent for these items or sub-groups: cream, fish, eggs, lard and bacon drippings, white potatoes, bread, other baked goods, beer, and whisky.

Average intakes by the two methods agreed less well (within about ± 20 per cent) for these items or sub-groups: cottage cheese, meat, butter, deep yellow vegetables, "other" vegetables, and wine. Greatest divergence (more than ± 35 per cent) between the two intake averages occurred for poultry, citrus fruit, and cheese other than cottage.

Averages for intakes of fifty-nine persons, of course, tend to conceal individual variation. The extent to which individual recalls varied from their corresponding records in intakes of four items and groups of food is given in Table 2. About one-third of the intakes of meat and of whole fluid milk and more than half of the intakes of fats and oils and of vegetables and fruit reported on recalls came within ± 20 per cent of those reported on records.

NUTRIENT INTAKES

Average values for nutrients calculated for recorded and recalled diets are closer than the averages for intakes of broad groups of food. Averages for food energy and the nine nutrients studied ranged from perfect accord to within about 5 per cent of each other (Table 3). None of these differences was significant. Standard deviations signify that dispersions around the means of each nutrient

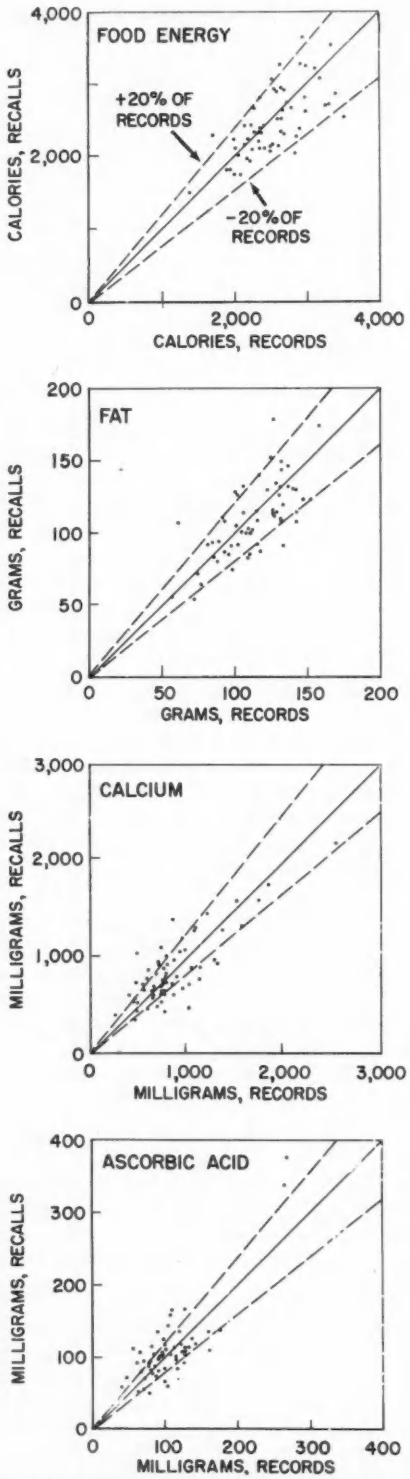

FIG. 2. *Recall (first week) vs. record (second week), comparing nutrients per day.*

TABLE 4 Agreement in average food intakes between first and second weeks, records vs. records in 1953 and recalls vs. records in 1954

FOOD GROUP	INTAKE RATIO 1st week : 2nd week	
	1953	1954
Dairy products, fluid milk equivalent in calcium	101	99
Meat, poultry, fish	106	111
Eggs	100	106
Fats and oils	101	92
Vegetables and fruit	108	100
Grain products—flour equivalent	97	100
Sugars and sweet spreads	91	93
Alcoholic beverages	92	111

were fairly similar for records and recalls. The greatest difference in dispersion was found in vitamin A value. This is a frequent finding about people's diets and is due to the occasional use of a few foods which are exceptionally rich sources of vitamin A.

These findings indicate that although the men reported a somewhat different emphasis on a few nutritionally important foods for the recall and record phases of their two-week study, their selections provided them as a group with diets of about the same nutritive content each week.

Average nutrients furnished per day by the food of the recall and record weeks were compared for each man (Figure 2). Some diets in the recall week were found quite like those in the record week; others were quite different.

A large share of the nutrient intakes estimated from recalls of intake were within ± 20 per cent of those estimated from records. About 90 per cent of the recalls came this close to their corresponding records in food energy, 80 per cent in fat, and 60 per cent in ascorbic acid. Relationships for some of the nutrients not illustrated were similar. Roughly 70 per cent of the recalled diets were within ± 20 per cent of the recorded ones in protein and 50 per cent in thiamine. In riboflavin, there was the widest variation, only about 40 per cent of the recall-record comparisons showing agreement within ± 20 per cent.

However, none of the nutrients calculated from recalled diets was significantly different from recorded diets when paired schedules were tested.

Recall-to-Record Compared with Record-to-Record

Relationships found between results obtained by the record and recall methods suggested that the differences between the pair of reports might be the result of usual week-to-week variation in people's diets. In exploring this, the recall which covered the seven days preceding the record was considered the first week and the record the second one.

Recall-to-record relationships for intakes of the

fifty-nine men in 1954 were compared with record-to-record relationships for intakes of the thirty-nine men in 1953 and found to be similar for broad groups of food. In both relationships, agreement between the two weeks was extremely close for some groups of food, with the largest differences about ± 10 per cent as shown in Table 4.

Ratios for average nutrient intakes were also similar except for vitamin A value and ascorbic acid, which were both higher the first of the two consecutive weeks in 1953. The data appear in Table 5.

In both sets of data, agreement between the paired diets of individual men for the first and second weeks was greatest for calories, fat, and protein (Table 6). In both sets, more than half of the paired diets agreed within ± 20 per cent in all nutrients but one—ascorbic acid in the record:record comparison and riboflavin in the recall:record comparison.

Discussion

1 WEEK VS. 2 WEEKS

Average intakes of foods and nutrients computed for the thirty-nine men from the records they kept the first week of the 1953 phase of the study were similar to those derived from the records for the next week. Since averages for one week gave as satisfactory information about current diets of the group as two consecutive weeks, a second week proved unnecessary to obtain a group picture of food intake and dietary levels.

However, for individual men, one week's diet was often somewhat different from the other. Neither week may have represented the diet of the men individually during the winter of 1953. Differences between the paired diets merely reinforce our knowledge that the items and amounts of food which individuals eat vary from week to week. Whether results from records for two consecutive weeks came close to the average of current individual diets at the time is unknown because neither a longer period nor two widely separated weeks were studied for these men.

McHenry and others (11) found that food records for one week did not represent diets for the year in a study of the constancy of food consumption in a year among thirty-one scientists and laboratory technicians. This conclusion was based on food records kept by participants the first week of each of twelve months.

A similar conclusion was reached by Chappell (3) who intensively studied the weekly food intakes of a university lecturer, aged thirty-four, for sixty-one weeks and later for nine weeks, and those of her father, aged sixty-six, for thirteen weeks. Chappell suggests that, "A more accurate estimate will be obtained from a number of one-week periods covering the year systematically than from a single sampling period of the same duration." Also, he warns, "The results of short-term dietary surveys should be interpreted with caution."

It seems safe to assume that it would be difficult to relate current dietary information to signs of aging or other physical degeneration that may be the result of a lifetime, or at least years, of eating by an individual. Over the years, there has been an ever widening variety of food available and, in addition, an increasing proportion of adults has been deliberately making fairly major changes in diets.

Longitudinal studies of human health among specific persons such as have been initiated in the last decade or so should include systematic and regular

TABLE 5 Agreement in average nutrient intakes between first and second weeks, records vs. records in 1953 and recalls vs. records in 1954

NUTRIENT	INTAKE RATIO 1st week : 2nd week	
	1953	1954
Food energy	98	98
Protein	101	102
Fat	98	96
Calcium	100	100
Iron	100	100
Vitamin A value	121	96
Thiamine	100	100
Riboflavin	105	100
Niacin	106	100
Ascorbic acid	117	105

TABLE 6 Distribution of intakes of nutrients by relationships between first and second weeks, records vs. records, in 1953 and recalls vs. records in 1954

INTAKES OF FIRST WEEK COMPARED WITH INTAKES OF SECOND WEEK	PER CENT OF RECORDS OR RECALLS						
	Food energy	Protein	Fat	Calcium	Thiamine	Riboflavin	Ascorbic acid
Records vs. records							
Less than 80% agreement	3	5	13	13	15	10	8
80 to 120% agreement	94	85	79	64	62	59	44
More than 120% agreement	3	10	8	23	23	31	48
Recalls vs. records							
Less than 80% agreement	3	7	12	22	20	36	14
80 to 120% agreement	90	73	78	56	54	44	59
More than 120% agreement	7	20	10	22	26	20	27

collection of information on the diets of participating subjects. This work should be done by persons expert in interviewing and well informed about people's food habits.

RECALLS VS. RECORDS

The similarity in averages for the recall and record weeks of the fifty-nine men studied in 1954 suggests that either method—recall or record—would have served as well as the other to provide group averages of food intake and its nutritive content. However, for individuals, there were differences, some small and some large, between the dietary information provided in the recall and record weeks. On the average, these differences were no greater than those found between the two weeks of the record study made the previous year.

There is no evidence that either of the two methods gave better results than the other about the current diets of this group of business and professional men. The cost of this study would have been considerably less per diet if completely done by the recall method. Interviewers made one home visit of about an hour to obtain the information for a recall. On the other hand, the initial home visit to start the record took about an hour, and in addition about three shorter visits were made to supervise the couple's record keeping. The travel time for such supervisory visits also added greatly to the cost of the study.

To provide equally sound data, interviewers collecting data by the recall method usually require a longer instruction period and perhaps need to have a better background in food habits and greater judgment than those using the record method.

Data obtained by the two methods underwent the same processing steps—editing, coding, summarizing, tabulating, and calculating. Summarization of food intakes on recalls took somewhat more time because most of the amounts of food eaten had to be converted from household measures to grams. For recorded food intakes, this was necessary only for food eaten away from home. A table of conversions expedited this operation. Length of time taken for the other operations was not affected by method.

If a representative sample is wanted, there is evidence that this is more easily obtained by the recall method in which the participant discharges his duties in one interview than by the record method in which the participant has week-long duties to perform at meal time (15).

Summary and Conclusions

Segments of two major problems in collecting dietary information from individuals were explored in a study of the food intakes of a small group of business and professional men in Minneapolis-St. Paul during the winters of 1953 and 1954. How findings on food intake and nutritive content from diets recorded for two consecutive weeks would relate to those from diets recorded for one week was studied, using records kept by thirty-nine men in 1953. To compare results obtained by the recall and record methods, use was made of dietary information recalled for a seven-day period by fifty-nine men in 1954 with records for these same men for the following seven days.

The men who participated in the study and their wives who assisted them were unusually able and cooperative. The interviewers employed in collecting the information were nutritionists and a home economist who were experienced in survey work and who had been given intensive schooling in the procedures for this particular study.

From the results obtained in this study of current diets of business and professional men, it appears reasonable to conclude that: (a) one week proved as satisfactory as two consecutive weeks; and (b) the recall method proved as satisfactory as the record method.

References

(1) TRULSON, M. F., AND MCCANN, M. B.: Comparison of dietary survey methods. J. Am. Dietet. A. 35: 672, 1959.

(2) PEEL, R. M., AND DODDS, M. L.: Nutritive intake of women factory employees. Comparison of non- and high-absence groups. J. Am. Dietet. A. 33: 1150, 1957.

(3) CHAPPELL, G. M.: Long-term individual dietary surveys. Brit. J. Nutrition 9: 323, 1955.

(4) BABCOCK, M. J., CHURCH, H. N., AND GATES, L. O.: Nutritional status of industrial workers. 1. Dietary, blood, and physical findings. Milbank Mem. Fund Quart. 32: 323, 1954.

(5) YOUNG, C. M., CHALMERS, F. W., CHURCH, H. N., CLAYTON, M. M. TUCKER, R. E. WERTZ, A. W., AND FOSTER, W. D.: A comparison of dietary study methods. 1. Dietary history vs. seven-day record. J. Am. Dietet. A. 28: 124, 1952.

(6) YOUNG, C. M., HAGAN, G. C., TUCKER, R. E., AND FOSTER, W. D.: A comparison of dietary study methods. 2. Dietary history vs. seven-day record vs. 24-hr. recall. J. Am. Dietet. A. 28: 218, 1952.

(7) EPPRIGHT, E. S., PATTON, M. B., MARLATT, A. L., AND HATHAWAY, M. L.: Dietary study methods. 5. Some problems in collecting dietary information about groups of children. J. Am. Dietet. A. 28: 43, 1952.

(8) YOUNG, C. M., CHALMERS, F. W., CHURCH, H. N., CLAYTON, M. M., GATES, L. O., HAGAN, G. C., STEELE, B. F., TUCKER, R. E., WERTZ, A. W., AND FOSTER, W. D.: Cooperative Nutritional Status Studies in the Northeast Region. 3. Dietary Methodology Studies. Northeast Regional Pub. No. 10. Mass. Agric. Exper. Sta. Bull. 469, August 1952.

(9) CHALMERS, F. W., CLAYTON, M. M., GATES, L. O., TUCKER, R. E., WERTZ, A. W., YOUNG, C. M., AND FOSTER, W. D.: The dietary record—how many and which days? J. Am. Dietet. A. 28: 711, 1952.

(10) YUDKIN, J.: Dietary surveys: variation in the weekly intake of nutrients. Brit. J. Nutrition 5: 177, 1951.
(11) MCHENRY, E. W., FERGUSON, H. P., AND GURLAND, J.: Sources of error in dietary surveys. Canad. J. Pub. Health 36: 355, 1945.
(12) HUENEMANN, R. L., AND TURNER, D.: Methods of dietary investigation. J. Am. Dietet. A. 18: 562, 1942.
(13) KEYS, A., ANDERSON, J. T., MICKELSEN, O., ADELSON, S. F., AND FIDANZA, F.: Diet and serum cholesterol in man: Lack of effect of dietary cholesterol. J. Nutrition 59: 39, 1956.
(14) WATT, B. K., AND MERRILL, A. L.: Composition of Foods—Raw, Processed, Prepared. USDA Agric. Handbook No. 8, 1950.
(15) MURRAY, J., BLAKE, E. C., DICKINS, D., AND MOSER, A. M.: Collection methods in dietary surveys. A comparison of the food list and record in two farming areas in the South. Southern Cooperative Ser. Bull. No. 23, April 1952

BIOGRAPHICAL NOTES FROM THE HISTORY OF NUTRITION

James Henry Salisbury—October 13, 1823–August 23, 1905

Tables of food composition are readily available today, but they are a development of this century. The first chemical analysis of an American food was the work of J. H. Salisbury who, in 1848, analyzed Indian corn or maize. At that time, he was assistant chemist for the New York State Geological Survey. He later practiced medicine and was a strong advocate of ground beef in the treatment of many diseases; the menu term, "Salisbury steak," is believed to have originated from Dr. Salisbury's frequently recommended dietary remedy.

James Henry Salisbury was born October 13, 1823 at Scott, New York, the son of Nathan and Lucretia (Babcock) Salisbury. His early education was at the local academy and then at Rensselaer Institute of Troy, New York, where he obtained his bachelor's degree in 1846. That same year he was appointed Assistant Chemist for the State of New York and two years later received the $300 prize awarded by the New York State Agricultural Society for his essay on the history and chemical composition of maize. In 1850, he obtained a medical degree from Albany Medical College and began the practice of medicine, but his main interest appears to have been in chemistry and research. As early as 1849 he began the study of germ disease first in plants and later in animals and men. He published an article in the *American Journal of Medical Science* (1862) in which he attributed measles in Army camps to fungi on straw.

As one reads Salisbury's own description of his investigations on food and disease, one is reminded of the earlier experiments of William Stark, although Salisbury was more fortunate in the outcome of his studies. In 1854, Salisbury conceived the idea of living exclusively on one food at a time and began studies on himself. He began with baked beans; at the end of three days he was "flatulent, constipated, head dizzy, ears ringing, limbs prickly and was wholly unfitted for mental work." He continued these studies for two years, and then hired small groups of healthy men to live for periods on oatmeal porridge only, or Army biscuits, or bread or other cereals, or vegetables only. In each case, the men were in poor condition at the end of thirty days but improved at once when given chopped beef. In all cases, Salisbury made careful microscopic examination of the blood and feces. In his own words, he was "a thorough microscopist and chemist." He made many careful observations but drew the wrong conclusions.

Salisbury believed that improper alimentation was a predisposing cause of disease and that one of the major problems was too much use of starch and sweet foods and fruits. He advocated a diet of two parts meat and one part vegetable, fats, and fruits. The fruits were to be taken only after breakfast or dinner and on a full stomach. The preferred meat was the muscle of lean beef freed from connective tissue and fat, chopped, and pressed into cakes, ½ to 1 in. thick, and broiled slowly until moderately done.

Salisbury practiced medicine for some years in Cleveland, where he helped to organize the Charity Hospital Medical School and was Professor of Pathology, Physiology, and Histology (1864-66). In 1860, he married Clara Brasee of Lancaster, Ohio, and about 1880 went to New York. He died suddenly August 23, 1905, from a cerebral hemorrhage at his summer home in Dobbs Ferry, New York.

REFERENCES: Salisbury, J. H.: The Relation of Alimentation and Disease. 4th ed. N.Y.: 1900; Todhunter, E. N.: Biographical notes from the history of nutrition. William Stark. J. Am. Dietet. A. 29: 572, 1953; Dictionary of American Biography. (Malone, D., ed.) N. Y.: Charles Scribners' Sons, 1935.—*Contributed by E. Neige Todhunter, Ph.D., Dean, School of Home Economics, University of Alabama, Tuscaloosa.*

Bone Density of East Indian and American Students[1]

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STIEBELING HAS reported (1) that dietary surveys made by the United States Department of Agriculture show that almost one-third of American families consume less than the recommended amounts of calcium. In India, where milk is often scarce, calcium intakes frequently are below levels recommended in America. Ways of assessing nutritional status in respect to calcium are needed. Bone density measurements are being used increasingly since they furnish an index of cumulative mineral status. This index thus extends information regarding calcium requirements derived from balances which are essentially influenced by the just-previous dietary intake.

The purpose of this study was to compare bone density measurements, as an index of mineral status, of a group of American students and a group of students of different racial, cultural, and nutritional backgrounds.

From bone density measurements on young adult human beings, Williams *et al.* reported (2) individual differences in bone density which were not readily altered with marked changes in calcium intake. A tendency was observed for lower values in the taller, heavier subjects.

In studies with rats, young animals adapted to a low-calcium intake by retarded growth. They had a low-calcium body content and low bone density. Animals restricted to equal amounts of food at adequate calcium levels were also retarded in growth but had total body calcium and bone density proportionate to the calcium intake. Rats fed *ad libitum* on the high-calcium diet grew more and had more body calcium and denser bones that litter mates fed the same diet in restricted amounts. Mature rats, three to four months old, indicated a reduced calcium requirement on the basis of bone density measurements, calcium content of the body, and specific functions using calcium[45]. Schraer and Schraer reported (3) that young rats which had received a calcium supplement after sixty-four days on a low-calcium diet had increased bone density values within seven days.

Odland found (4) a significant positive relationship in human subjects between bone density and age during adolescence, a period of rapid growth. In data for both sexes from five to eighty years of age, Odland *et al.* observed (5) no significant differences between age groups. A study of bone density with aged subjects (sixty to ninety-eight years) made by Gershon-Cohen *et al.* (6) indicated no significant differences with age. Wide individual variations were noted. The degree of osteoporosis showed good correlation with density coefficients. Fisher and Dodds studied 117 subjects. They concluded (7) that neither the *os calcis* nor the *phalanx* (end) showed quantitative changes of mineralization within the normal range of calcium intake for humans.

Experimental Plan

Bone density of eight American men and eight American women was measured. The ages ranged from eighteen to thirty-two years. For comparison, a group of eight men and six women from India and

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two women from Pakistan was studied. (For brevity all of these subjects will be referred to as Indians.) Their ages ranged from twenty-two to forty-seven years. All subjects were students at the University of Tennessee. The Indians represented the relatively small group of a socio-economic and educational level that has access to a more adequate diet than the average Indian.

For each subject an X-ray was obtained of the left hand, including the wrist. The little finger was positioned on a cardboard holder containing a no-screen X-ray film as illustrated in a pamphlet from The Pennsylvania State College (8). A portable X-ray machine was used in taking the roentgenograms. An alloy wedge of known density (4.85) on loan from the above institution was the standard. The X-ray tube was 36 in. from the film. It was operated at 50 KV and 10 to 12 MAS for simultaneous exposure of the finger and wedge. The films were developed at the University's hospital clinic. The density tracings were made from the X-ray through the center of the second phalanx of the little finger (phalanx 5-2) by means of a Leeds and Northrup microphotometer. The average thicknesses of flesh and bone penetrated by the X-rays can be calculated as well as the length of the pathway traced. It is then possible to assign a density coefficient to the bone alone, to flesh alone, and to the total bone plus flesh. The value reported in this paper is expressed as the *coefficient of density* of bone. This, as stated by Schraer (9), represents the number of grams of the aluminum-zinc alloy which would absorb the same amount of X-radiation as the bone through the given pathway, per cubic centimeter of bone.

For each of two subjects, two different X-rays were taken and five tracings made for each X-ray for testing reproducibility of repeated determinations. One person made the tracings. For the twenty tracings, the standard deviation was 0.12 and the standard error of the mean was 0.03.

Results and Discussion

Experimental data are summarized in Table 1. Mean density coefficients for the two races were not statistically different, being 1.08 for the Indians and 1.12 for the Americans. Similarly, mean coefficients for the sixteen men and sixteen women were essentially the same, 1.06 and 1.14, respectively. Since there were no differences ascribable to race or sex, all thirty-two coefficients could be considered as derived from a homogeneous sample. They ranged from 0.69 to 1.43 equivalent grams alloy per cubic centimeter of bone with a mean value of 1.10, a standard deviation of 0.19, and a standard error of the mean of 0.03.

For the majority of subjects, the age range was between twenty and thirty years. There was a wide range in heights and weights. Density coefficients for the whole group appeared to be independent of age, height, and weight. For the Indian men, however, the correlation between density coefficients and weights approached significance ($p = 0.1$), even with only eight subjects. Average weight was 136 lb.; average height, 67 in. On the average, the American men were heavier by 30 lb. and taller by 3 in. For them, the correlation coefficient was not significant. In fact, it was negative in sign, suggesting a tendency toward decreased density of bone in

TABLE 1 Age, weight, height, and density coefficients of Indian and American subjects

SUBJECT	AGE	WEIGHT	HEIGHT	DENSITY COEFFICIENT*
		Indian Subjects		
	yr.	*lb.*	*in.*	
Men				
1	25	106	65	0.69
2	25	128	68	0.81
3	44	116	68	0.94
4	47	142	68	0.97
5	25	146	67	0.97
6	28	149	69	1.03
7	40	174	68	1.24
8	25	126	64	1.31
Mean . . .	32±10†	136±21	67±2	1.00±0.20
Women				
9	28	114	62	0.96
10	23	161	69	1.05
11	25	142	66	1.13
12	33	119	62	1.20
13	36	93	64	1.23
14	25	120	64	1.25
15	36	120	61	1.26
16	26	88	61	1.27
Mean . . .	29±5	120±24	64±3	1.17±0.11
Mean for all Indian subjects . . .				1.08±0.16
		American Subjects		
Men				
17	26	141	68	0.69
18	25	173	70	0.89
19	23	172	69	0.95
20	27	218	75	1.10
21	21	160	68	1.29
22	18	170	71	1.31
23	25	142	70	1.39
24	26	151	68	1.43
Mean . . .	23±3	166±25	70±2	1.13±0.27
Women				
25	21	111	65	0.88
26	27	144	66	0.93
27	20	117	65	1.07
28	22	130	64	1.11
29	24	104	61	1.18
30	32	151	68	1.25
31	31	150	68	1.26
32	22	112	62	1.30
Mean . . .	24±5	127±19	65±3	1.12±0.15
Mean for all American subjects . . .				1.12±0.21

*Density coefficient in alloy equivalent grams per cubic centimeter of bone.
†Standard deviation.

people who have failed to meet the increased calcium requirement of a large frame. This same tendency in American women was noted by Williams *et al.* (2).

EVALUATION OF DENSITY COEFFICIENTS

The density coefficients were grouped on the basis of the frequencies of their differences from the mean in terms of one or two standard deviations. They presented a fairly normal distribution slightly skewed toward the lower values. Bone density would thus seem to be a physical attribute, such as body weight or body temperature.

For the evaluation of bone mineralization, the authors have followed the rule-of-thumb method of Greulich and Pyle (10) in assessing skeletal development for individuals. On this basis, one standard deviation above or below the mean density coefficient for phalanx 5-2 (0.91 to 1.29) will include approximately two-thirds of the population tested. Also, two standard deviations above or below the mean (0.72 to 1.48) probably will include 90 per cent, in addition to some whose bone mineralization is retarded because of disease or nutritional inadequacy. Physiologically, a similar interpretation of over-mineralization probably should not be attached to reasonably higher-than-average coefficients since bone is recognized as the storehouse for body reserves of certain minerals (Stearns [11] and Thomson [12]). A difference of more than two standard deviations above or below the mean makes it highly probable that the individual is abnormally advanced or retarded.

Variation in density coefficients between subjects ($\pm$ 0.19) was greater than the variation due to experimental error ($\pm$ 0.12). This seemed to indicate the operation of some definite factors influencing bone density other than those tested. From dietary histories and physical data on the subjects, some information was available concerning the possible influence of diet on growth and bone density. The probable deviation of the mean (0.7 the standard deviation) for weight and height was obtained. The subjects were then divided into groups representing those of small, medium, and large weights or heights in ratios of 25, 50, and 25 per cent. By relating extremes of weight and height with density coefficients, the subjects were divided into three groups as follows:

Group 1—tall (69 to 75 in.) or heavy (157 to 218 lb.) subjects with the average density coefficient of 1.10 or less (three American men, one Indian man, one Indian woman).

Group 2—short (61 to 63 in.) or light (88 to 117 lb.) subjects having density coefficients above the mean (four Indian women, two American women).

Group 3—the remaining subjects ranging in size from small to large (62 to 71 in., 106 to 174 lb.) with density coefficients covering the entire range from 0.69 to 1.43 (seven Indian men, three Indian women, five American men, six American women).

Disregarding momentarily the extremes designated in Groups 1 and 2, subjects in Group 3 demonstrated the tendency shown by the Indian men for bone densities to increase with increased weight. Here, correlation between density coefficients of the twenty-one subjects and their weights was highly significant ($p = 0.01$). The inference is that both growth and bone mineralization are dependent on common dietary factors. Data from this laboratory on growing rats suggest a dietary basis for the correlation between density coefficients and weights. The work of Nicholls and Nimalasuriya on Ceylon children gives (13) further evidence for the relationship between density of bone and body weight. Measurements of the mineral content of human skeletons from a range of age groups led them to suggest that the average calcium per kilogram of body weight is essentially the same for all individuals within a particular age group. They, therefore, calculated requirements based on body weights of upper class children because they were well grown. They made similar calculations for British boys, assuming that the average calcium per kilogram of body weight is more or less the same for any age group of any country.

Thorangkul *et al.* reported (14) bone density evaluations for seven subjects who had subsisted for long periods on different levels of calcium intake. Their findings indicated a correlation between long-continued calcium intake levels and bone densities. Furthermore, their records showed a difference of 19 lb. in average weight in favor of those on the liberal calcium level.

Schraer and Newman studied (15) Indian boys in Vicos, Peru, in the age groups of thirteen to fifteen and sixteen to twenty years. They had lower bone densities than white boys in the United States in the same age groups. According to the authors, "the slow and retarded growth, maturation and phalangeal mineralization of the Vicos boys and the ultimately small body size of the adult men probably reflect body economy in utilizing the meager amount of available calcium, as well as an inadequate total nutritional environment."

Lack of correlation between density coefficients and body weights for the entire group seems to be due to the inclusion of subjects at the two extremes of body size. The relation of bone density to size in Groups 1 and 2 may have a dietary basis also. Adaptation to generally inadequate diets during infancy and childhood may be by limited growth (Nicholls and Nimalasuriya [13], Schraer and Newman [15], and McCarrison [16]). It can, therefore, be postulated that the short, light people with above-average bone densities in Group 2 had apparently adapted by

retarded growth to a diet low in some nutrient(s) other than calcium. A moderate amount of dietary calcium could have then built a denser-than-average bone. All subjects in this group were women, the majority being Indians. It may also be noted that a Filipino in Thorangkul's study (14), who had been on a low-calcium intake *throughout life,* was short and light with a higher-than-average density coefficient.

If a calcium deficiency occurs after growth has ceased, less dense bones may eventually result (Owen *et al.* [17]). The tall, heavy subjects of Group 1 must have had a sufficiently adequate diet during early life to have achieved above-average growth. The lower-than-average bone densities, however, indicate that the adult calcium intake had not kept pace with the increased requirement of a larger skeleton. The majority in this group were American men. It included, however, both sexes and both races.

SIGNIFICANCE OF RESULTS

The answers to problems of calcium requirements for normal growth and adult maintenance are still controversial. Balance studies are difficult to conduct, the information obtained is necessarily limited, and results are hard to interpret. Bone density experiments require a minimum of effort on the part of the subject. Density coefficients represent cumulative mineral status and are quantitative in nature. They can be obtained on whole population groups.

This study, as well as others, suggests that bone mineralization is not a racial characteristic. If true, measurements made on various population groups with recognized differences in nutritional histories should afford a means of relating diet, skeletal development, and mineralization at different ages. This, in turn, would help in a much needed assessment of mineral requirements.

Advocates of lower amounts than now recommended for adults point to whole populations who obviously have adapted to low levels and survived (Hegsted *et al.* [18]). The present study suggests that a low adult requirement for a nutrient may have been due to retarded growth in childhood. This does not seem to be an adequate basis for setting low requirements for a population for which it is hoped so-called ideal weights, heights, adult maintenance, and reproduction may be attained. Quantitative bone density measurements can add a useful tool to the exploration of the present gaps in knowledge concerning this and other problems of calcium metabolism.

Summary

Bone density measurements were determined from X-rays of the little fingers of thirty-two students. There were sixteen Indian and Pakistani subjects and sixteen Americans, with equal numbers of both sexes in each group. The mean density coefficient of phalanx 5-2, as determined in this study, was 1.10 equivalent grams alloy per cubic centimeter of bone with a standard deviation of 0.19 and a standard error of the mean of 0.03. An evaluation of the data was made on the basis of the standard deviation.

Density coefficients varied among individuals more than could be explained by experimental error.

Statistical analyses for all subjects gave no indication of correlation between density coefficients and race, sex, age, weight, or height.

By arranging the subjects according to size (small, medium, or large) in a 25, 50, and 25 per cent ratio and relating to density coefficients, three groups were obtained:

(a) Five tall, heavy subjects with average density coefficients or less.

(b) Six short, light subjects with above-average density coefficients.

(c) Twenty-one subjects whose bone densities tended to vary with weight.

The significance of the results has been discussed in terms of the need for quantitative measures of bone mineralization in assessing calcium status and requirements throughout the human life cycle.

References

(1) STIEBELING, H. K.: Food and nutrient consumption trends and consumer problems. Fed. Proc. 17: 770, 1958.

(2) WILLIAMS, D. E., MCDONALD, B. B., MORRELL, E., SCHOFIELD, F. A., AND MACLEOD, F. L.: Influence of mineral intake on bone density in humans and in rats. J. Nutrition 61: 489, 1957.

(3) SCHRAER, H., AND SCHRAER, R.: Quantitative measurements of bone density changes in rats fed diets of different calcium content. Fed. Proc. 15: 571, 1956.

(4) ODLAND, L. M.: Bone density relationships in adolescence. Fed. Proc. 15: 567, 1956.

(5) ODLAND, L. M., WARNICK, K. P., AND ESSELBAUGH, N. C.: Cooperative Nutritional Status Studies in the Western Region. II. Bone Density. Mont. Agric. Exper. Sta. Tech. Bull. 534, 1958.

(6) GERSHON-COHEN, J., SCHRAER, H., AND BLUMBERG, N.: Bone density measurements of osteoporosis in the aged. Radiology 65: 416, 1955.

(7) FISHER, K. H., AND DODDS, M. L.: Calcium intake of adolescents and young adults. J. Am. Dietet. A. 34: 392, 1958.

(8) Instructions for Exposing and Developing X-ray Films for Bone Density Evaluation. State College, Pa.: Pennsylvania State College, 1953.

(9) SCHRAER, H.: Variation in the roentgenographic density of the os calcis and phalanx with sex and age. J. Pediat. 52: 416, 1958.

(10) GREULICH, W. W., AND PYLE, S. I.: Radiographic Atlas of Skeletal Development of the Hand and Wrist. Stanford, Calif.: Stanford Univ. Press, 1950.

(11) STEARNS, G.: Human requirement of calcium, phosphorus and magnesium. J.A.M.A. 142: 478, 1950.

(12) THOMSON, A. M.: Technique and perspective in clinical and dietary studies of human pregnancy. Proc. Nutrition Soc. 16: 45, 1957.

(13) NICHOLLS, L., AND NIMALASURIYA, A.: Adaptation to a low calcium intake in reference to the calcium requirements of a tropical population. J. Nutrition 18: 563, 1939.

(14) THORANGKUL, D., JOHNSTON, F. A., KIME, N. S., AND CLARK, S. J.: Adaptation to a low-calcium intake. J. Am. Dietet. A. 35: 23, 1959.

(15) SCHRAER, H., AND NEWMAN, M. T.: Quantitative roentgenography of skeletal mineralization in malnourished Quechua Indian boys. Science 128: 476, 1958.

(16) MCCARRISON, R.: The nutritive value of wheat, paddy, and certain other food-grains. Indian J. M. Res. 14: 631, 1927.

(17) OWEN, E. C., IRVING, J. T., AND LYALL, A.: The calcium requirements of older male subjects with special reference to the genesis of senile osteoporosis. Acta med. scandinav. 103: 235, 1940.

(18) HEGSTED, D. M., MOSCOSO, I., AND COLLAZOS, C.: A study of the minimum calcium requirements of adult men. J. Nutrition 46: 181, 1952.

Etiology of Congenital Malformations

Estimates of the incidence of malformations have been variable and it is with uncertainty that one cites as the most reliable any of the several figures now available. The reasons for the lack of uniformity in reported rates become apparent when the various surveys are examined. In the first place, there is a considerable range of views as to what constitutes congenital malformations. Most writers agree that they are defects present at birth—hence congenital—but disagreement arises as to the meaning of the word malformation. Should its original and literal meaning be adhered to and the term applied only to anatomical defects that appear to be the result of aberrant embryonic processes, or should it be broadened to include functional and metabolic disorders, such as mental deficiency and the inborn errors of metabolism? Should all minor deviations from the norm be considered anomalous, or should an arbitrary criterion such as whether the defect in question is likely to cause clinical disease be set up? The answers to these questions can make a difference of several percentage points in the rate of malformations finally arrived at.

Maternal dietary deficiencies. This category of agents has been widely studied in laboratory animals and much of the fundamental knowledge now available in the field of experimental teratology has been gained through such studies. There is, however, no proven instance of human malformation resulting from maternal dietary deficiency. The effects of starvation on human gestation were studied during World War II when conditions of famine existed in parts of Europe. Smith undertook a survey of infants born during and following the severe food shortage in Holland in 1944 and 1945. The most striking effect was a marked reduction in the number of pregnancies—it was estimated that 50 per cent or urban women became amenorrheic. No clear-cut effect was noted on abortion, stillbirth or neonatal mortality. Prematurity and congenital malformations were thought to be slightly increased, but the data were inconclusive because the total number of pregnancies was too small.

Under what were probably more drastic conditions of starvation during the siege of Leningrad in 1942, Antonov observed a considerable increase in the number of premature and stillborn infants. Children born during and following this period weighed an average of 500 gm. less than the normal average, and showed greatly increased morbidity in the neonatal period. No observations were made on congenital malformations. Thus, it seems that severe restriction of dietary intake primarily affects the birth rate, which is sharply curtailed. There is no definite proof that the incidence of malformation is increased.

A number of deficiencies have been found to be teratogenic in animals but most of them involved a specific vitamin. In each case an adequate diet was maintained except for the single deficient substance. With regard to this substance there was usually a delicate balance between the degree of deficiency which resulted in termination of pregnancy and that which permitted gestation to continue but under sufficient privation to cause malformation. Such a critically maintained deficiency of a single dietary component is highly unlikely to occur in human nutrition.—*Excerpted from "Factors Involved in Causing Congenital Malformations" by James G. Wilson. Bull. N.Y. Acad. Med. 36: 145, 1960; contributed by Mary P. Huddleson, Former Editor,* JOURNAL OF THE AMERICAN DIETETIC ASSOCIATION.

The Teaching Dietitian's Place in Nursing Education[1]

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IF YOU are to lend your efforts in the preparation of the nurse, you are probably asking yourselves why so many training patterns and what, after all, *is* a nurse? Is she someone who wears a white uniform and takes care of the sick in the hospital or in the home? Is she someone who demonstrates and teaches nursing care to families in the hospital or in the home? What is she prepared to do, and what contribution does the teaching dietitian make to her preparation?

What, I might ask, is a teaching dietitian? Is she today what she was when this Association was founded in 1917? Is she what she could be? Will she be prepared better tomorrow? If your profession is trying to scrutinize your past, your present, and your future in terms of preparation for your changing role in the health field, you are probably ready to listen to my story about nursing and its evolving patterns of education.

Historical Background

In the "good old days," say about 1900, when we had no airplanes, no radio, no television, no cobalt bomb, and no "teaching dietitians," we were quite sure what a nurse was and how she should be trained. We called her a trained nurse to distinguish her from the practical nurse, and her training consisted of a year or more of practical experience in a hospital. The education of the nurse in those days was entirely the function of the hospital, and the nurse received this education through an apprentice-like system of training on-the-job. Along with learning how to care for the sick in the hospital, she also learned how to plan meals and cook food for the patients in the hospital. When she completed her training, she worked as a private duty nurse caring for the sick in the home, and a part of her activity was the preparation and serving of food to her patients. How much the nurse knew or was taught regarding nutrition and food preparation at the turn of the century, I do not know, but the woman who entered nursing in those days was a fairly mature person who probably had had considerable experience in preparing and serving food before she entered the hospital to "take up" nursing.

In 1917, when the first curriculum for schools of nursing was published, a 40-hr. course in nutrition and cookery and a 10-hr. course titled "diet-in-disease" appeared in the list of required courses. Dietitians had now made their appearance as employees of hospitals, and directors of nursing were quick to enlist their services as teachers of dietetics in schools of nursing. In addition to teaching these nutrition courses in the classroom, dietitians also taught students in the practical aspects of food preparation in the diet kitchen or the main kitchen of the hospital. By 1920, the practice of sending students to the diet kitchen to learn diet therapy was well established as an essential part of the nursing curriculum. When the curriculum was revised in 1927 and again in 1937, dietitians and nutritionists were included as members of the committees which worked on these revisions. As might be expected, the courses in nutrition and diet therapy became more and more prominent in the nursing curriculum, and by the time the 1937 curriculum was published, these courses were built up to approximately 100 hr. of lecture and laboratory with an accompanying six to eight weeks of experience in the diet kitchen.

This pattern of teaching nutrition and diet therapy was fairly well established in most of our hospital training programs by 1940, and it is probably the pattern best known and understood by dietitians. Though the pattern still persists and is in

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 26, 1959.

fact required for many of our hospital training programs, by virtue of state regulations governing nursing curricula, other patterns have evolved in the past twenty years as more and more of our nursing education programs have been established in institutions of higher learning.

Changes in the Last Twenty Years

Just as the work of nutritionists and dietitians has undergone change in the past two decades, so has the work of the nurse. In fact, nursing and nursing education in the United States has experienced something akin to a revolution in this short period of time. With our entry into World War II, the increased demand for nurses and nursing service was tremendous. To help meet the shortage of nurses, we added large numbers of auxiliary personnel, such as aides, orderlies, record clerks, and the like, by training these workers on-the-job, and eventually we established short-course programs for the training of practical or vocational nurses. When the shortage of doctors became acute, some of the duties previously performed by them were turned over to nurses, and this made it doubly necessary for us to re-evaluate our duties to determine which of our nursing tasks could be delegated to persons with less extensive training. Thus, the increased demand for nursing service led to the study of nursing functions, division of labor, and the creation of a large number of auxiliary personnel.

Another change which has come about in the past twenty years is the development of college or university nursing education programs. As the nurse has assumed more and more of the technical procedures formerly performed by doctors, and as advances in the natural and behavioral sciences and in medicine and public health have brought forth new knowledge, the work of the nurse has expanded and changed. Where formerly she was found only in the hospital or home, today she is found wherever people are found—in schools, clinics, doctors' offices, and sometimes on trains, ships, and airplanes. She is also found in a wide variety of educational pursuits and organizational activities.

Today the patient—the consumer of nursing service—has been taught through our vast network of public educational programs, that health is a state of physical, mental, emotional, and spiritual well-being—not merely the absence of disease. The kind of nursing care he seeks varies according to his needs, and it is not the kind of care he sought or received twenty years ago.

Collegiate Nursing Education Programs

To keep abreast of these changes and to match the nurse's preparation with her expanding responsibilities, we have worked steadily toward the development of collegiate nursing education programs. University affiliations for hospital training programs had been introduced as early as 1909, but it was not until after World War II that our college and university programs had an appreciable enrollment. Since that time we have established a number of new university and college programs and have reorganized and improved many of our old ones. These programs which are located in four-year colleges or universities lead to the baccalaureate degree. They are designed to prepare students for graduate study in nursing as well as for hospital nursing, school nursing, industrial nursing, and public health nursing. In other words, the graduates of our baccalaureate programs have been prepared for the broad field of community nursing service. Thus they function at the professional level—that is, with a fair degree of independence by virtue of their broad liberal and professional education for nursing.

Junior College Programs

Finally the latest development in our scheme of nursing education is the associate degree program which is offered in our junior and community colleges. This program came about as a direct result of the nursing shortage and the need to prepare more nurses for the functions usually associated with the hospital staff nurse. As I pointed out earlier, our hospital training programs had been preparing nurses for staff positions in hospitals and for private duty nursing, but they were not preparing and could not prepare enough to meet our ever growing needs.

The more we struggled with this problem, the more evident it became that we needed to differentiate the functions of nursing and develop different kinds of programs to prepare nurses for these functions. When we began to study the functions of nursing and differentiate them into the basic categories of the professional, the semi-professional or technical, and the assisting, it became more and more obvious that the bulk of nursing functions lay in the semi-professional or technical category. On study of our educational institutions, it also became apparent that the junior or community college was the institution specifically suited to this kind of education. True, these institutions offer two years of liberal arts for those who plan to go on to senior colleges or universities, but they also offer a large number of two-year programs for those who do not plan to obtain a baccalaureate or higher degree, but who wish some preparation beyond high school. Then, too, when we looked hard at what was happening to the enrollments in these institutions, particularly in relation to women, we also saw the possibility of recruiting a new group of college students for nursing.

Many studies of our hospital training programs had pointed up the fact that we could shorten our

training programs, possibly to two years if our programs were focused entirely on the education of students and if the students were freed of their nursing service responsibilities. Many of our friends in the educational field and in other disciplines had suggested the possibility of developing junior college programs for nurses, but the credit for setting up the research project and carrying forth the experimentation with these programs must be given to Mildred Montag (1), who spearheaded the whole movement. As a result of her experimentation, approximately forty of these programs have been established and other junior colleges appear eager to follow suit. These programs cover a period of two years, are under the control of junior colleges, and prepare their graduates for technical nursing, that is for staff nursing in hospitals and private-duty nursing.

In truth, patterns of nursing education have been through a period of evolution and revolution in the past ten years. To keep pace with the demands for nursing, to improve our education for nursing, and to tap all possible sources of woman power for the profession, we now have developed four types of nurses to provide care to patients and their families in hospitals, homes, and health agencies. We have:

(a) The registered nurse who receives her professional preparation in a senior college or university.

(b) The registered nurse who is prepared in a hospital training program.

(c) The registered nurse who is prepared in the junior college program.

(d) The vocational or practical nurse who is licensed after one year of training in an accredited program.

What are the differences in these four programs and what help do we seek from the teaching dietitian in implementing these programs?

Practical Nursing Program

Suppose we begin with the practical nursing program. The aim of this program is to train a nurse who can "care for subacute, convalescent, and chronic patients requiring services at home or in institutions, who works under the direction of a licensed physician or a registered professional nurse, and who is prepared to give household assistance when necessary" (2).

This training program may be under the control of a hospital, a private school, or it may be offered under the Board of Education as a part of its vocational or adult education program. The program covers a period of one year with approximately two-thirds of the time being given to practical nursing experiences in one or more hospitals. Class room discussions, laboratory work, and demonstrations covering the other one-third of the time usually precede the hospital experience, though this varies from school to school.

It is recommended that students entering these programs have completed at least two years of high school or its equivalent, but many of the candidates have high school preparation, and some have gone to college. Some of these students are seventeen or eighteen years of age, others are mature women—mothers or even grandmothers. Thus, the learning experiences in each area of the curriculum will depend not only on the student's level of intelligence, and educational background, but on her life experiences as well.

The entire program is geared toward helping these students learn technical procedures, such as bathing the patient, making beds, helping patients sit up, turn over, or get out of bed. Students also learn how to give oral medications, assist with dressings and treatments, and take care of the patient's environment. And, of course, they receive instruction concerning the ethics of the milieu in which the nurses and doctors work.

The unit of instruction which deals with meal planning and preparation as outlined in the guide for developing this curriculum (3) was planned jointly by nurses, home economists, and specialists in nutrition. Ordinarily, the registered nurses responsible for the nursing instruction in these programs will also teach the content relating to meal planning and preparation, but many of them will turn to the teaching dietitian to help them or to help the students when the latter are having practical experience in hospitals. *I would see the dietitian serving primarily as a resource to the nursing faculty in the practical nursing program.*

Hospital Training Programs

In the hospital training program, the dietitian employed by the hospital usually receives an appointment to the nursing faculty. As a member of the faculty of the school of nursing, she participates in curriculum planning and is responsible for teaching the courses in nutrition and diet therapy and in supervising the work of the student nurses when they are assigned to the diet kitchen. Since the aim of the hospital training program is to prepare the nurse for staff nursing in the hospital and for private practice, the emphasis in this program is on care of the sick.

Students must have completed high school before they can enter these programs, and most of these students are eighteen to twenty years of age.

As students in the school of nursing, they receive board, room, laundry, and in some instances a small monthly stipend. In some schools, students pay tuition and provide their own uniforms and books. In others, there may be no fee or the school may pro-

vide books and uniforms. Inasmuch as the cost of the student's maintenance and her education are an added expense to the hospital, she is expected to help provide nursing service in the hospital, that is, she is depended on to staff the hospital for a given number of hours each week, whether on the day, evening, or night shift.

Thus she serves as a nurse while she is learning how to become a nurse, and this apprentice-like pattern of education is often beset with problems for the student and also for the faculty who is responsible for planning and implementing the educational program. Once the dietitian understands this, she is in a better position to plan the student's work in both the classroom and the diet kitchen.

Many different curricular patterns for the teaching of nutrition and diet therapy in hospital training programs have been prepared by nurses and dietitians working together. The National League for Nursing and The American Dietetic Association have formed an interorganizational committee which met twice in the 1957-59 biennium. During these meetings a statement of philosophy was developed and a tentative list of "Understandings and Abilities Needed by Nurses in Relation to Nutrition and Diet Therapy" was prepared (4). We now have twenty-five interorganizational committees of this type established at the state level to discuss common problems and develop materials for teaching. *I would see the teaching dietitian as a regular faculty member of the hospital school of nursing. In this capacity she would serve as a teacher of students in the classroom and in the diet kitchen, and as a co-worker with the other faculty members.*

Junior College Curricula

Now let us turn to the associate degree programs in nursing. These are new, and they represent a distinct departure from our hospital training programs in several ways. They cover a period of two years. They are under the control of and are organized within the philosophy of the junior college. Students in these programs are regular enrollees of the college and are not required to provide nursing service in any hospital. The faculty who teach these students are all appointed and employed by the junior college offering the program.

The program includes clinical nursing courses and general education courses. The amount of general education varies somewhat with the college, but the graduates qualify for the Associate in Arts or the Associate in Science degree. The learning experiences which are offered in the hospital or hospitals and clinics are organized as nursing laboratory periods, and all such learning experiences are under the guidance and control of the faculty. Since nutrition is taught by the home economics department in the college, the only contact which a teaching dietitian would have with these students would be in the clinical situation when they are in a given hospital or clinic for their nursing laboratory activities. Here I would think, the dietitian would be asked to take part in conferences relating to a particular patient's nutritional problems, and she also might be sought out by a student who felt the need for a conference with her because of her expertness in the field of nutrition and diet therapy. *The dietitian could also be helpful in these programs by serving as a consultant or a resource to the faculty.* In whatever way she helps with the teaching program of the junior college student, I am sure she will find that these students who live at home, in a college dormitory, or in a sorority and who go to college to learn how to function as a staff nurse are different from students in hospital training programs.

Baccalaureate Program

Finally, we come to the university or senior college program for nursing which leads to the baccalaureate degree. How does this program differ from the others, and what is the role of the teaching dietitian in it? As I indicated earlier, these programs have been evolving for the past fifty years, and there has been great diversity in them, particularly in relation to curriculum design, content, and organization. Within the last 10 years, however, we have developed a number of new bona fide university programs, and the organizational pattern of these new ones is being used as a model to reorganize old programs and establish more new ones.

These programs cover a period of approximately four years and are aimed to prepare selected college students for professional nursing practice in all fields of nursing, either as members or leaders of nursing teams. These schools may admit students who have completed two years of college work in the humanities, the natural sciences, and the social sciences, or they may admit students in the freshman year. Whichever pattern is used, the program will be planned so that at least 50 per cent of the course work will be in the liberal arts field. The student in this program will have one or two years of university level course work in chemistry, physiology, and biochemistry and will have a fair knowledge of nutrition when she begins her work with patients.

Like the student in the junior college program, this student goes to college to become a nurse. Courses are planned on the academic year basis, and all nursing laboratory work, whether in the classroom, hospital, clinic, or home, will be under the guidance and supervision of university nurse faculty members who plan these learning experiences in patient care according to the learning needs of the students.

In a few of our university programs, we find a nutritionist or a dietitian employed as a full-time

faculty member to work with the students and teach them in the clinical situation. In other programs, we find hospital or medical center dietitians and nutritionists appointed as clinical faculty members. Sometimes a nutritionist in the out-patient department or in a health department helps these students teach a patient or a number of patients how to adjust their diets to their needs or the needs of their families (5). Occasionally we find a dietitian participating in a class discussion with a physician, an anthropologist, and a nurse faculty member. The focus in this program is on the nutritional needs of the patient and how he or she can be helped to understand this need, accept it, and do something constructive about it in his or her everyday living and working situation.

When dining room service for patients (6) is being used in hospitals, the dietitian assists in helping students learn how to observe patients and their food habits and (hopefully) how to initiate the appropriate action to help patients with their food problems. In one university program (7) the psychiatric nurse faculty member, who also serves as the supervisor of the psychiatric unit, and the dietitian have worked out a plan whereby the raw food comes to the psychiatric ward and the patients are allowed to plan their own meals, cook them, sit at tables family style, and eat together. This is utilized to teach students as well as to help patients, and many of the facets relating to economic, social, psychologic, and physiologic needs of people receive study and treatment in this setting.

There are countless other ways in which the dietitian lends her expert help in the education of students in these university programs. Each situation will provide some possibilities for nutrition experts and nurse faculty members to work together to develop meaningful teaching programs. *I would see the teaching dietitian as a faculty member and/or a resource to faculty and students in classes and clinical situations in our nursing education programs which lead to the baccalaureate degree.*

Whatever the dietitian's role in the education of nurses, she will want to have a clear understanding of the aims of each of these programs, the level of the students' education, and the framework within which she will function as a teacher or a consultant. What she will contribute and how appropriate this contribution will be, will depend on her own educational background and her effectiveness as a teacher.

References

(1) MONTAG, M. L.: Community College Education for Nursing; an Experiment in Technical Education for Nursing; Report of the Cooperative Research Project in Junior-Community College Education for Nursing. N. Y.: McGraw-Hill Book Co., Inc., 1959.

(2) Practical Nursing Curriculum. Suggestions for Development Programs of Instruction Based upon Analysis of Practical Nurse Occupation. U. S. Office of Educ. Misc. Bull. No. 11, 1950.

(3) OREM, D. E.: Guides for Developing Curricula for Education of Practical Nurses. U. S. Office of Educ. Vocational Div. Bull. No. 274, 1959.

(4) Understandings and Abilities Needed by Nurses in Relation to Nutrition and Diet Therapy. N.Y.: Natl. League for Nursing, 1959.

(5) CRENSHAW, V. P.: Teaching patients. Am. J. Nursing 50: 666, 1950.

(6) COSTON, H. M.: Dining room service for hospital patients. Nursing Outlook 7: 425, 1959.

(7) BOGIGIAN, R.: Personal communication.

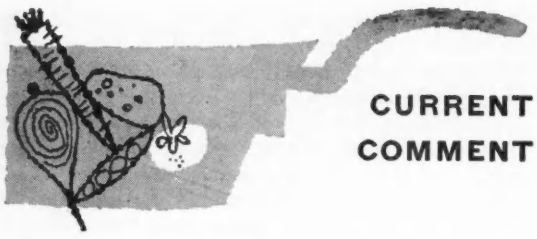
Device for Measuring Table Salt and Sodium

Many people must follow sodium-restricted diets due to heart, kidney, or other diseases. When a small amount of sodium chloride is permitted, a simple method to measure the weight of table salt accurately is desirable. Such a device has been designed for this purpose by a patient on a low-sodium diet, who found it both simple to make and convenient to use. It is described below.

The device consists of a small transparent funnel with a 1-in.-long stem, sealed at one end by a flame. The stem is graduated in the following manner. After cooling, 50 mg. table salt are weighed into the funnel and a mark is made on the stem with a file or with waterproof ink. This is repeated at 50-mg. intervals, until 250 mg. salt have been weighed into the funnel and five marks are made. The stem is tapped gently before each mark is made to obtain more reproducible results.

Since table salt contains 39.35 per cent sodium by weight, this device may also be used in terms of sodium. For this purpose, a round number of 40 per cent is used to convert the weight of sodium chloride to sodium. Thus 100 mg. table salt is equivalent to 40 mg. sodium, and 250 mg. to 100 mg. sodium.

This device can be produced easily in large quantity, using glass, Pyrex, or plastic funnels. Only the first one must be calibrated as described, since others with the same diameter of stem can be marked at the proper places using the first as a "master."—*Ying Victor Wu, Department of Chemistry, Cornell University, Ithaca, New York.*



CURRENT COMMENT

Nursing Education at the College Level[1]

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AS CONCEPTS in nursing change, so must we in the field of nutrition be flexible and change our teaching to prepare the nurse for the varying roles she must assume. Often our interest is greater than our ability to see these problems clearly. This, undoubtedly, was the basis for forming the interorganizational committee of The American Dietetic Association and the National League for Nursing which is currently engaged in a study of the teaching of nutrition in the schools of nursing. Most states have formed committees patterned along the lines of the national organizations and are working on similar problems at the local level.

In every phase of nursing, the need for more and better teachers, more efficient administrators, more supervisors, more head nurses and clinical specialists properly trained for their work is urgent. The fact that more than one-fifth of all registered nurses are employed in administrative, supervisory, and teaching positions is significant and evidence of the need for proper preparation for these functions. The importance of providing nursing education on the college level to prepare sufficient candidates for such specialized functions has been repeatedly emphasized (1).

It has been said that learning is manifested by a change in behavior which results from experience and which is relatively permanent. In a school of nursing, we have an ideal opportunity to stimulate such learning.

We must take a long-range view of our objectives and assure ourselves that they cover both the areas of theory and practice. Often teaching is defined in terms of content to be covered and devices to be used, rather than in terms of goals to be reached (2).

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 26, 1959.

In a collegiate program in nursing, we try to furnish the basic tools which the nurse will need to function adequately in her relationship with patients, physicians, and other members of the health team. In addition, we hope to enrich her background to include a broader understanding of the relationship of nutrition to health and the total care of the patient.

At the Medical College of Virginia, we offer a basic nutrition course in the fall quarter of the sophomore year. This is followed by diet therapy which is part of the medical-surgical nursing course and extends over the next three quarters. The faculty members involved in teaching this combined course work as a group in planning activities, such as preparation of class outlines and evaluation scales and tests, as well as organizing teaching in the clinical area. This method of teaching is time-consuming and requires the close cooperation of the instructors involved.

To prepare students for the many specialized fields they may wish to enter, we offer a course in advanced nutrition in the junior year. Because a nurse is a citizen of a world community, she is acquainted with the nutrition work of the United Nations and other international organizations. Since she must always be prepared to function efficiently in case of a major disaster, she is taught about those foods which would be safe to use for emergency feeding and the special problems of certain groups, such as children and those with diabetes. Some of the problems of feeding in wartime, flight feeding, and the needs of the "space man" are discussed.

To equip her for teaching in the public health field, she prepares visual aids, views films, and discusses the level of teaching suitable for clients of public health agencies. Because of the growing importance of occupational nursing, some of the problems of the nurse in industry are stressed. The facilities of a large research center are at our disposal for the study of modified diets used in these unusual situations. Each student is requested to prepare a term paper on an area of her choice which will acquaint her with the current literature available in the field of nutrition.

As we improve our program, we are shifting much of the teaching from the classroom to the clinical area. For example, we feel that the best time for the student to learn about the feeding of children is at the point when she is assigned to the pediatrics division for study of other aspects of the nursing of children. This is also the appropriate time for her to be assigned to the nutrition clinic and to participate in the nutritional instruction offered in the well baby clinic.

To cope with the boredom brought about by such activities as repetitious writing of modified diets

and serving trays which has characterized our traditional clinical experience, we are trying a new approach, that of basing our teaching around problem-solving activities. An example of such a meaningful experience might be to have the student discuss with other members of the dietary department the difficulties involved in feeding patients with leukemia who must be kept in a completely sterile environment during specialized treatment.

We have not yet solved all our problems, but perhaps in the words of Carlyle (2), "Our main business is not to see what lies dimly at a distance, but to do what lies clearly at hand."

References

(1) BRIDGMAN, M.: Collegiate Education for Nursing. N. Y.: Russell Sage Foundation, 1953.

(2) SAND, O.: Curriculum Study in Basic Nursing Education. Report of a Project Being Conducted in the School of Nursing, University of Washington. N. Y.: G. P. Putnam's Sons, 1955.

An Associate Degree Program in Nursing[1]

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The nursing program at Bakersfield College prepares students to carry out those nursing functions attributed to registered nurses. This is one of the "new," so-called two-year programs in pre-service education. Our first class of students was admitted in September 1957 and graduated in June 1959.

The educational philosophy of the program focuses on preparing students for nursing care at the side of the patient in a program administered and controlled by an educational institution. Four hospitals serve as the clinical laboratories in which students gain experiences in the care of sick persons under the supervision of nurse-instructors who are faculty members of the College.

The total educational program developed for these students is intended to prepare them, also, as well rounded individuals and as citizens. The sequence of instruction, both in academic courses and in the nursing major, has been developed through cooperative functioning of nurse and non-nurse faculty and other instructional personnel to prepare the students for logical progression.

Instruction and learning experiences in the nursing courses are correlated with instruction in other related courses. The content in one subject is utilized by the different instructors in their respective courses to re-enforce students' previous learning and its application to meet their needs in understanding and applying principles that enhance their nursing care of patients. Instructional content is presented in relation to the student caring for the patient as a person—a member of the family—a member of the community rather than emphasizing sequent courses or units.

For example, students' awareness of nutrition is developed in the basic course called "Fundamentals of Nursing" by considering foods and their relation to personal health, normal growth, and development. Their own dietary habits are discussed, emphasizing the importance of choosing foods for their daily meals and snacks that provide for energy needs, tissue growth and repair, and regulation of body processes without increasing body weight. Preparing the patient for his meals, such as washing his hands, providing for his oral hygiene, preparing the bed table to receive the tray, and arranging his immediate environment for enjoyment of the meal are items discussed in class. The manner of serving the tray, the effects of physical pain and of psychologic reactions on the appetite, and the importance of assisting a patient by placing his food within convenient reach, by feeding him, or by encouraging him to finish his meal are stressed.

It is during this phase that we first receive the help of the teaching dietitian in the hospital. She prepares and presents a lecture on the basic principles of diet; reviews and re-enforces students' knowledge of food and nutrition; identifies the various classifications of diets; and emphasizes the importance of the therapeutic or modified diet as a prescription given by the physician. She re-enforces previous instruction pertaining to personal health needs and practices and discusses the effects of poor dietary planning, "crash" diets, and other questionable practices.

A tour of the dietary department and an opportunity to see how hospital dietary services function follow the formal class presentation.

Chemistry, which is taught concurrently in the program and precedes the formal course in nutrition, provides knowledge about calories, the chemical structure of carbohydrates, fats, and protein, and the significance of water and mineral balance. Students learn the effect of temperature on food—food preservation or destruction through chemical action—the nitrogen cycle, and the effects of acids and alkalies on nutritional substances. The physiology course, particularly in relation to the gastrointestinal tract and related organs, similarly serves

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 26, 1959.

to strengthen students' understanding of the effects of both sound and poor nutritional practices on a person's health.

The course in nutrition has been developed by the College's instructor in the home economics area with some awareness of students' prior knowledge. She enlarges on the part played by foods in both preventive and therapeutic diets and provides opportunities for students to plan a variety of menus.

Our students are not assigned to the diet kitchen to prepare foods in quantities. Various ways in which foods are prepared are demonstrated, as needed, by the nutrition instructor to the class group. In addition, the types of foods—their classification and usage in preparing therapeutic diets—are identified as important features.

Throughout the program, conferences are scheduled between nurse-instructors and dietitians and the nutrition instructor and the physicians to strengthen the correlation of instruction. The dietitians confer with students assigned to care for patients with dietary problems. It is in such conferences that the relationship of various laboratory tests and medications to the patients' dietary prescription are re-emphasized for students' benefit.

The educational pattern developed in this type of program demands the close and continuing cooperation of many persons. As students rotate through their clinical learning assignments caring for medical, surgical, maternity, and pediatric patients, the significance of good nutrition in growth and development and its importance in therapeutic and rehabilitative situations are emphasized.

We could not function without the assistance of hospital dietitians, the nutritionists in the clinics, or the instructor in the Home Economics Department. They have key positions in our total educational plan. The members of the nursing faculty have learned much from their guidance, and because of their help, have improved their instruction. We look to them as resource persons to the faculty and to students functioning in the clinical areas. We consider them as experts in their area of service, and as such their consulting role is unquestioned. Most important, however, is the relationship which has resulted in better teaching and learning. We are proud to be associated with these persons as co-workers and allied members of the health profession.

The Dietitian in a Diploma Nursing Program[1]

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UNTIL THIS year, regulations governing minimum curriculum offerings in California diploma schools of nursing have included 32 hr. instruction in nutrition, 16 hr. in diet therapy, and four weeks of clinical experience in diet therapy. The latter was interpreted as a four-week assignment to the diet kitchen under the supervision of the dietary staff. The usual duties assigned to students involved routine food preparation. Within the past decade, faculties in individual schools have critically examined the curriculum from two viewpoints: first, what is the objective of the school and second, does the subject matter offered and clinical practice provided promote the achievement of purpose? As a result, faculties began, albeit carefully and hesitantly, to break away from traditional ways of presenting course content and assignment of practice.

The cookery portion of the basic course was eliminated by some programs because the nurse seldom needs to prepare a patient's meals. Others incorporated the required hours of diet therapy into the course of clinical nursing in logical places where diet is an essential part of the total therapy plan for the patient. An innovation tried by others was to eliminate or reduce the diet kitchen time by substituting meaningfully planned experiences with patients having dietary problems.

In line with these trends, the minimum regulations have been revised and broadened. A course in nutrition has been retained as a requirement, but no specific mention is made of diet therapy. However, it is implied in the statement: "The curriculum shall be concerned with the preventive, remedial, supportive and rehabilitative aspects of nursing including the physical, emotional, and social components."

At present, all six diploma schools in the Los Angeles area have adopted the new trends in their programs. The pattern of organization of each hospital school and the judgment of the faculty influences the means by which this is done. In each school, the dietitian has participated in planning the changes. One school has a full-time dietitian on the school staff. In the others, dietitians serve as resource persons or devote part time to the school's teaching program. Three schools send students to a nearby college for the nutrition course. Two schools have retained a lecture course in diet therapy. Assignments to the diet kitchen range from a series of observations, to one to three weeks' experience in a single block of time. Objectives of the experience are clearly defined in most instances.

The planned activities usually include: inter-

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association, on August 26, 1959.

viewing patients with dietary problems; teaching a patient about dietary needs; observing a dietitian teach or interview a patient; planning, preparing, and eating a modified diet, such as a low-sodium or diabetic diet; and case studies of selected patients. Sometimes these activities are correlated with nursing practice, sometimes with the diet kitchen experience. The consensus of the school faculties is that these changes have resulted in more meaningful learning by the students.

Program at Los Angeles County General Hospital

To highlight these on-going general changes, I would like to describe the program at the Los Angeles County General Hospital as an example.

The school is an integral part of this large 3500-bed hospital maintained by the taxpayers of the county primarily for the care of the acutely ill who meet the eligibility requirements for admission. All normal diets, including modifications for age groups and increased nutritional needs of expectant mothers and of patients with tuberculosis and burns, are prepared in the main kitchen. In the diet kitchen are prepared approximately 20 per cent of the total diets, including all those that require weighing, measuring, or limiting amounts of any food or nutrient.

Individual food carts for each of the eighty-three adult wards are serviced in the main kitchen. Except for the diabetic wards, the nursing staff is responsible for serving the individual trays. Dietitians regularly observe the serving of food, confer with the nursing staff on dietary problems, and, on request, teach nursing staff groups the elements of food service to patients.

The School of Nursing offers a three-year curriculum in nursing focused on preparing the student for licensure as a registered nurse and for practice as a staff nurse in hospitals and clinics. The sequence of courses and clinical practice is based on the level of achievement expected of the student at the end of each year of the program. The faculty believes that all curriculum content contributes to the student's understanding of the nursing needs of patients and must, therefore, be correlated with clinical practice.

A two-unit course in nutrition is taught by a dietitian in the second half of the first year. As a result of knowledge learned and nursing experiences provided, it is expected that on completion of the first year the student will be able to: (a) plan a normal diet, (b) serve general and some specific modified diets with an understanding of the reason they are ordered, (c) record and report signs of dehydration, and (d) recognize the importance of fluid intake and output for the adult. This is followed in the second year with a four-week assignment to the diet kitchen where the student does not spend her time in routine food preparation. Planned experiences include: calculating therapeutic diets; adapting diets to the religious, cultural, and economic needs of the patient; and teaching nutrition principles to the patients. The student selects two patients for study, one on a low-sodium diet, the other on a diabetic diet. For these patients, she plans, prepares, and serves the meal. In addition, she plans, prepares, and eats a modified diet to better understand patients' feelings about dietary restrictions. No formal course in diet therapy is given.

The faculty has considered carefully the value of this four-week isolated assignment. Because the student needs guidance in incorporating the knowledge gained into the nursing plans for patients, the time was reduced to one week for the 1959-60 school year. The case studies of diabetic and low-sodium diets as outlined above will continue to be required of the student. The nursing instructors will incorporate into their own teaching plans the nutritional needs of patients.

To summarize, diploma schools expect dietitians to: participate in developing plans for inclusion of nutritional principles into the curriculum, have an understanding of the goals and educational philosophy of the school so that meaningful learning opportunities are given to students, and share their specialized knowledge and skills in purposeful ways that will support better nutrition for patients as well as students learning and understanding.

Printed Diet Sheets

The human factor in dietetic treatment . . . is clearly most important. The problems are different in every country and can only be met by a full knowledge and understanding of local people and their food habits. Personally, I deplore the practice of simply handing out printed diet sheets to patients. Every patient deserves a diet tailored to suit his particular habits and needs. A diet may appear perfect on paper, with the calories, proximate principles, minerals and vitamins calculated to 3 or 4 decimal places, but it is useless if the patient won't eat it.—*Dr. A. P. Meiklejohn, University of Edinburgh, Scotland, speaking before the Second International Congress of Dietetics, Rome, September 10, 1956.*

Winifred Howard Erickson

June 19, 1896—March 27, 1960

THE AMERICAN DIETETIC ASSOCIATION has lost a dedicated leader in the death of Winifred Howard Erickson. Mrs. Erickson was Director of Dietetics at Ancker Hospital, St. Paul, and former President of both The American Dietetic Association and the Minnesota Dietetic Association.

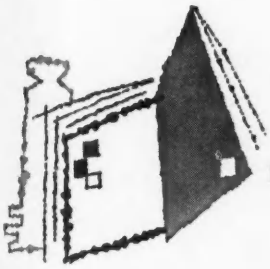
She was a graduate of the Wisconsin State College at Menomonie and also graduated in home economics and dietetics from the University of Minnesota. Her professional career paralleled closely the historical development of The American Dietetic Association which was founded in 1917. During that year, she was the first student dietitian enrolled at the University of Minnesota Hospitals and was also one of the first instructors of nutrition classes for the American Red Cross. Early in 1918, she accepted a position at the Eitel Hospital, Minneapolis, where she remained for more than three years. She was Assistant Chief and then Chief Dietitian in United States Veterans Hospitals from 1922 through 1924 .

Since January 1925, Mrs. Erickson had been director of Dietetics at the Ancker Hospital in St. Paul. For more than thirty years she had directed the educational training of dietetic interns at Ancker, which was included in the first list of approved courses for "student dietitians" published in the JOURNAL in March 1928. She had also served as Instructor in Dietetics at the College of St. Catherine.

She was acquainted with dietitians and their activities throughout the United States by virtue of her diversified activities and interest in local and national associations. In 1956, while serving as President of The American Dietetic Association, she represented the United States at the Second International Congress for Dietitians in Rome. At the national level, she had served as a member of the House of Delegates of The American Dietetic Association, of the Association's Nominating and Finance Committees, and on the Joint Committee of the American Hospital Association and The American Dietetic Association. She was Treasurer of A.D.A. from 1949 to 1951, and many will recall her work as local chairman of the 35th Annual Meeting in Minneapolis in 1952.

Her contributions at the state and national levels were equally numerous. She had held the office of President of the Minnesota Dietetic Association and of the Minnesota State Nutrition Council, as well as membership on the Council of the Minnesota Home Economics Association and other committees of these organizations.

Her humor, her enthusiasm, her faith, her capacity for hard work, her interest in people, and her unusual devotion and loyalty to her profession will live long in the memory of those who admired and respected her.—*Eleanor F. McCarthy, Department of Dietetics, Ancker Hospital, St. Paul.*



BOOK REVIEWS

Growth Diagnosis. By Leona M. Bayer and Nancy Bayley. Chicago: The University of Chicago Press, 1959. Cloth. Pp. 240. Price $10.

Although this book is intended for the physician's use in diagnosis and clinical evaluation and prediction, it does have interest as a reference for dietitians in clinics and public health work as well as college teaching and research, particularly in child development.

Clinical application calls for periodic photographs to present visual evidence of physical development; X-rays of hand and wrist to assess skeletal age; and three anthropometric measures, in addition to stature and weight—trunk length, bi-acromial diameter, and bicristal diameter. The authors believe that these measures reveal interrelated elements in the growth process. On the basis of their data on these measures, they present norms designed to identify normal growth patterns and to detect deviations.

It is of particular value for the non-medical reader for the case studies of normal boys and girls including early and late maturers and of some with deviations because of clinical causes. For the "normal" cases, there are consecutive photographs at periods from early childhood to maturity which show progressive bodily changes. In addition, actual data in tables are given longitudinally for stature, weight, bicristal diameter, and skeletal ages which will permit charting and comparative evaluations by the various other means available for the evaluation of growth and development.

The first part of the book describes in detail the methods of measurement, photography, and skeletal age determination as well as the recording of data and the use of thirty-six anthropometric tables with standard deviations for ten items for both boys and girls from one to eighteen years of age. Three charts are essential for a longitudinal record of a child. In addition for each period of evaluation, there is a rating profile for androgynic pattern of body form and deviation chart for anthropometric values.

We need to know more about growth and how to measure it. The present book undoubtedly contributes to such knowledge. However, its usefulness in serving the needs of individual children—its avowed purpose—must be evaluated in terms of time and cost involved in applying and interpreting the proposed growth measures.—*Helen A. Hunscher, Ph.D., Department of Home Economics, Western Reserve University, Cleveland.*

Therapeutic Nutrition with Tube Feeding. By Morton D. Pareira, M.D. Springfield, Illinois: Charles C Thomas, 1959. Cloth. Pp. 58. Price $3.75.

Tube feeding has become a basic tool in the alimentation of patients in the past few years, and few people associated with a general hospital have failed to note the advantages to be gained by using it in rehabilitating the malnourished patient. This volume reports weight gains, nitrogen retentions, increases of serum albumin and hematocrit in a large number and variety of patients during tube feeding for varying periods.

An interesting section on the history of tube feeding is included, as are a precise definition of tube feeding and directions for choice of tube, its insertion and the administration of the feeding at various rates and intervals. Unfortunately, data are given on only one feeding mixture, a proprietary product. This product is sold as a powder to be mixed with water and is a stable suspension after mixing, so that a day's supply may be prepared at one time. For a small organization with limited facility for the preparation of formula mixtures, it may be the best and safest product available. However, the ratio of protein and other specific nutrients to calories is extremely high. The author does not give details of urinary excretions of nitrogen and other nutrients though he warns of the need to provide additional water for the patient to prevent nitrogen retention.

It is questioned whether a formula of the concentration recommended is needed for every patient and whether such a formula should be administered to every patient who could profit by tube feeding. Certainly, the intake of simple carbohydrate and salts is sufficiently high that skepticism concerning the inference that diarrhea is not encountered with this feeding is justified.

Feeding by the usual oral, parenteral, or intravenous routes is always individualized to meet the needs of the patient in relation to age, sex, size, disease, and previous depletion. It would seem reasonable to assume that individualization of prescription in tube feeding would be equally useful. In fact, other laboratories have reported excellent rehabilitation with whole blended diets or simplified milk mixtures tailored to fit the needs of the particular patient. These diets supply a much smaller load of nitrogen, minerals, and vitamins, much of which will require excretion by a body already under stress.

The author of this publication quotes *Therapeutic Nutrition*, published by the Food and Nutrition Board, National Research Council, in justification for the mineral, vitamin mix used. This reviewer was unable to find a formula in the latter publication which corresponded to that recommended by Dr. Pareira in either absolute amounts or ratios between ingredients. Since nutrient requirements are specific for the individual and there probably also are interrelationships between nutrients, it seems unfortunate to leave the impression that the formula has been planned to the specifications outlined in *Therapeutic Nutrition.—Margaret A. Ohlson, Ph.D., Director, Department of Nutrition, University Hospitals, State University of Iowa, Iowa City.*

Zabriskie's Obstetrics for Nurses. By Elsie Fitzpatrick and Nicholson J. Eastman. Philadelphia: J. B. Lippincott Company, 1960. Cloth. Pp. 571. Price $6.

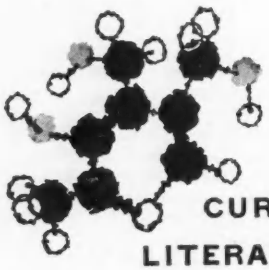
The tenth edition of this well known text for nurses continues to include sound and up-to-date information on nutrition as it relates to pregnancy, lactation, and weight control.

RECENT BOOKS RECEIVED

Strategies of Leadership in Conducting Adult Education Programs. By A. A. Liveright. New York: Harper & Brothers, 1959. Cloth. Pp. 140. Price $3.50.

Manual of Applied Nutrition. Fourth edition. By Nutrition Department, The Johns Hopkins Hospital. Baltimore: The Johns Hopkins Press, 1960. Paper, spiral bound. Pp. 134. Price $3.

Soil, Grass, and Cancer. By André Voisin. Translated from the French by Catherine T. M. Herriot and Dr. Henry Kennedy. New York: Philosophical Library, Inc., 1959. Cloth. Pp. 302. Price $15.



CURRENT LITERATURE

Contributed by Janette C. Carlsen, The Johns Hopkins Hospital, Baltimore; Clara Karl Frederick, University of Chicago Clinics; Elizabeth Tuft, Chicago Wesley Memorial Hospital; Margene A. Wagstaff, Elmhurst, Illinois, and the JOURNAL *staff.*

ACTA SOCIETATIS MEDICORUM UPSALIENSIS

Vol. 64, Nos. 5-6, 1959

*The effect of protracted administration of small doses of alloxan on the Islets of Langerhans in rats fed on diets rich and poor in carbohydrates. B. Hellman.—p. 393.

*The copper content of Swedish infants' food. L. Söderhjelm.—p. 499.

Effect of Small Doses of Alloxan. Protracted administration of alloxan with both carbohydrate-rich and carbohydrate-poor diets was investigated in rats. Both the BIA cell number and volume ratios were significantly higher on the carbohydrate-rich diet. The results are discussed, especially in relation to the hypothesis that small alloxan doses have a stimulating effect on the B cells of the islets. This study offers no support for this hypothesis, but it strongly suggests that the protracted administration of small amounts of alloxan has a depressing effect on the B cells. However, it cannot be entirely excluded that, by changing the dose of alloxan given or the interval between doses, it might have been possible to alter the composition of the islets in a different way.

Copper in Swedish Infants' Food. The daily copper requirements for infants is said to be 0.08 to 0.10 mg. per kilogram body weight. A one-year-old would require about 1 mg. copper daily. Some powdered infant formulas, common in Sweden, were analyzed by the American Dry Milk Institute, and results are presented in this paper. Also given is the copper content of tap water, cow's milk, and human milk. Judging from the figures in these tables, most infants subsisting on cow's milk formulas only are grossly underfed with regard to copper. However, since very few infants have been reported with hypocupremic anemia, these individuals probably have an excessive requirement of copper or lose copper in a much higher degree than babies in general. The normal infant either has a large store of copper or the daily requirement is considerably less than hitherto given.

THE AMERICAN JOURNAL OF NURSING

Vol. 60, February, 1960

*Sodium restricted diets. B. Heap.—p. 206.

Vol. 60, March, 1960

*The relation of diet to atherosclerosis and infarction. S. A. Hashim.—p. 348.

Sodium-Restricted Diets. Instruction and information on sodium-restricted diets is given here for the benefit of nurses. Three booklets form the basis of much of the discussion—*Your 500 Milligram Sodium Diet, Your 1000 Milligram Sodium Diet,* and *Your Mild Sodium Diet,* published by the American Heart Association in 1958. Hints are given on counseling the patient, with background information on sodium content of foods, water, and medicine. Knowledge of how sodium is measured, carefully planned menus, salt substitutes, and recipe adjustment are necessary also.

Diet and Atherosclerosis. This summary article concerns the many facets of the problem of dietary constituents and atherosclerosis and coronary heart disease. By means of a diagram, the possible relation of certain ingested fats to arterial occlusion is portrayed. Reference is made to studies showing the relationship between diet and other environmental factors, and blood lipids. Less is known about the relationship between dietary fats and blood coagulation, and between blood lipids and atherosclerosis. An important question awaiting solution is: Does long-term lowering of serum cholesterol "protect" the individual from coronary heart disease? Although many such questions are yet unanswered, strides are being made toward implicating diet in the pathogenesis of atherosclerosis.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 198, February, 1960

*Role of the pancreas in reduction of fecal fat and cholesterol by dietary protein. L. Fragola and D. F. Magee.—p. 354.

The Pancreas in Reducing. Rats with separation of the pancreatic ducts and sham operated controls were fed 8 per cent and 30 per cent casein diet. Fecal fats were lowered by the high-protein diet in each case. The magnitude of the decrease was not different in the two groups. The experiment was repeated with the addition of 2 per cent cholesterol to the two diets. Both groups of animals, while on the high-protein diet, had less fecal cholesterol than on the low-protein regimen.

ANNALES MEDICINAE EXPERIMENTALIS ET BIOLOGIAE FENNIAE

Vol. 37, Supplementum 7, 1959

*Serum lipids in young men during military service. A. Konttinen.—p. 8-104.

Serum Lipids in Military Men. The main object of this investigation was to study whether changes occur in the serum lipid levels of men during military service and whether the possible changes in men undergoing heavy training differ from those receiving light training. In the series of 187 Finnish men, serum total cholesterol declined to a highly significant degree during the first eight weeks. The total cholesterol remained at this reduced level throughout the service period. The fall in the total phospholipids during the first eight weeks was also highly significant. Later during the military service, the total phospholipids rose significantly towards the initial level. Physical activity did not alter the serum lipid levels. Factors that may be considered responsible for the reduced serum lipids during military service are discussed. However, no competent explanation for this circumstance can be presented.

ANNALS OF INTERNAL MEDICINE

Vol. 51, December, 1959

*Oral antidiabetic therapy. R. H. Williams, R. H. Pollen, D. C. Tanner, and R. H. Barnes.—p. 1121.

*Further observations on the mechanism of ulcer pain. E. C. Texter, Jr., G. R. Vantrappen, H. P. Lazar, E. J. Puletti, and C. J. Barborka.—p. 1275.

*Evaluation of appetite suppressants. L. J. Cass.—p. 1295.

Hyperchlorhydria, duodentitis and duodenal ulcers: A clinical study of their interrelationships. J. D. Ostrow and R. H. Resnick.—p. 1303.

Clinical, physiologic and psychologic study of 20 geriatric clinic patients. R. B. Hickler, S. Gifford, J. T. Hamlin, III, B. J. Murawski, H. R. Tyler, and R. E. Wells, Jr.—p. 1335.

Vol. 52, February, 1960

*Studies in atherosclerosis. III. An epidemiologic study of atherosclerosis in Trappist and Benedictine monks: A preliminary report. J. G. Barrow, C. B. Quinlan, G. R. Cooper, V. S. Whitner, and M. H. R. Goodloe.—p. 368.

Oral Antidiabetic Therapy. Oral therapy must be carefully evaluated, noting the effect of the drug not only on the levels of glucose in the blood and urine, but also on many phases of the metabolism of carbohydrates, proteins, and fats, as well as the long-term effect on health. The sulfonylureas presumably lower the blood sugar by stimulating insulin production and by decreasing hepatic glucogenesis. They are most effective in elderly patients with stable diabetes of recent onset. Phenethylbiguanide inhibits certain oxidative enzymes of the Krebs' cycle, especially succinic dehydrogenase and cytochrome oxidase. The biguanide may lower the blood sugar in all types of diabetes, but the best effect occurs with the mild, stable type. For patients with unstable diabetes, control is improved by administering insulin or a sulfonylurea in addition to biguanide. The high incidence of side effects has limited the use of phenethylbiguanide.

Ulcer Pain. A study of 151 persons indicated that ulcer pain was accompanied by a significant increase in motility, as measured by intraluminal pressure wave activity. A significant delay in gastric evacuation accom-

panied ulcer pain, despite the hypermotility of the antrum. These findings are thought to be due to increased resistance at the pyloric sphincter. Relief of pain occurred spontaneously in most instances with resumption of evacuation activity. Relief of pain following ingestion of food appears to be due to increased motor activity. The data do not support the concept that ulcer pain is produced by direct chemical irritation by hydrocholoric acid. The mucosal engorgement accompanying the ulcer may lower the threshold to hydrochloric acid, permitting the acid and perhaps other stimuli to initiate the reflex disturbance in the motor activity of the stomach and duodenum, thus causing pain.

Appetite Suppressants. Ten anorexigenic agents and a placebo were evaluated in 214 patients over an eight-week period. Four of the drugs were commercially available amphetamine preparations, four were combinations of amphetamine with two different calmatives, and two were non-amphetamine products. All medications with the exception of the placebo produced varying degrees of appetite control.

Studies in Atherosclerosis. An epidemiologic study of members of a Trappist and of a Benedictine monastery is reported. The diet of the Trappist community is lacto-ovo-vegetarian, with 26 per cent of the calories from fat. The Benedictines consume an omnivorous diet containing 45 per cent of the calories as fat, mostly from animal sources. The Trappist group had significantly lower levels of most serum lipid constituents, but, on an individual basis, serum lipids could not be correlated with fat intake alone. It is concluded that most serum lipids vary on a group basis with age and dietary fat intake, but that on an individual basis, other factors are operative.

ARCHIVES OF INTERNAL MEDICINE

Vol. 105, January, 1960

Essential fatty acids in nutrition and metabolism. R. T. Holman.—p. 33.

Hypocholesteremia in idiopathic steatorrhea; with a report of a case of profound hypocholesteremia of life-long standing. I. S. Friedman, H. Cohn, M. Zymaris, and M. G. Goldner.—p. 112.

ARCHIVES OF PEDIATRICS

Vol. 77, February, 1960

*Electrophoretic studies of serum proteins in nutritional edema in Egyptian children. S. Awwaad and E. M. Abdel-Wahab.—p. 85.

Serum Proteins in Nutritional Edema. The changes which occur in the electrophoretic pattern of serum proteins in nutritional edema were studied in Egyptian children. A constant and marked reduction in the total proteins, as well as in the albumin and the beta globulin fraction, was noted, while the alpha[1] and alpha[2] globulin fractions were less frequently affected. The gamma globulin continued to be normal or became moderately elevated. With the clinical disappearance of the edema, the reduced levels tended to return to normal while the gamma globulin continued to rise. These results support the recent concept that, although hypoalbuminemia and nutritional edema always co-exist, the former could not be considered as the sole causal factor for the latter.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 81, December 1, 1959

*Pine House (Saskatchewan) nutrition project. S. C. Best and J. W. Gerrard.—p. 915.

Vol. 82, February 20, 1960

*Clinical trial of high dosage vitamin E in human muscular dystrophy. G. M. Berneske, A. R. C. Butson, E. N. Gauld, and D. Levy.—p. 418.

Pine House Nutrition Project. Pine House is a small isolated community of 200 people living on the edge of Pine Lake some 40 mi. west and 10 mi. north of La Ronge, Saskatchewan, Canada. The population is largely Metis. Often the sole source of income is the family allowance check. The inhabitants live mainly by trapping and fishing, and they subsist for the most part on bannock and fish, supplemented by lard, a little milk, and fresh meat, mainly moose and muskrat. The only medical aid is provided by a public health nurse, and her only means of transport is by air; the nearest general hospital is 200 mi. away. An examination of forty-four school children at Pine House and of thirty-one pre-school children at Pelican Narrows in the Northern Saskatchewan Administrative Area revealed no manifest deficiency diseases, although in many instances the vitamin A and ascorbic acid serum levels were below the recognized normal levels and hypoproteinemia and anemia were also common in the younger children. Scabies, usually secondarily infected, pediculosis, and throat infections were extremely common at Pine House. To insure better health, a higher standard of hygiene as well as of nutrition is required. The children also need more medical and dental care.

Vitamin E and Muscular Dystrophy. Thirty-three patients with muscular dystrophy were treated either with 2000 I.U. alpha-tocopherol succinate daily, administered orally, or a placebo. One-third of the patients received placebos. Sixteen were boys with childhood muscular dystrophy, and sixteen were adults of both sexes with the limb girdle or facio-scapulhumeral form of the disease. No evidence of toxicity to vitamin E developed at this dosage. The patients were observed for periods of one to three years. At the end of the trial, the patients were classified according to their response. Of those receiving vitamin E, one showed marked deterioration, four had moderate deterioration, six had slight deterioration, seven showed no change, and four improved slightly. Of those receiving placebos, one patient deteriorated markedly, one moderately, two slightly, and in six there was no change. One improved slightly. Statistical analysis in which "no change" and "slight improvement" were regarded as positive responses and the remainder as negative showed that there is no reason to suppose that vitamin E is any more effective in producing a positive response than a placebo.

CEREAL CHEMISTRY

Vol. 37, January, 1960

*The relative effects of enzymatic and physical changes during storage on the culinary properties of rice. H. S. R. Desikachar and V. Subrahmanyan.—p. 1.

Soy flour as a white bread ingredient. 1. Preparation of raw and heat-treated soy flours, and their effects on dough and bread. J. M. Pollock and W. F. Geddes.—p. 19.

Soy flour as a white bread ingredient. II. Fractionation of raw soy flour and effects of the fractions in bread. J. M. Pollock and W. F. Geddes.—p. 30.

*Some volatile aromatic compounds in fresh bread. L. Wiseblatt and F. E. Kohn.—p. 55.

*The effect of the degree of polishing of rice on nitrogen and mineral metabolism in human subjects. G. Rama Rao, H. S. R. Desikachar, and V. Subrahmanyan.—p. 71.

*Note on the irradiation of flours from thirteen varieties of wheat. C. C. Lee.—p. 78.

A note on the vitamin B content of Korean rice. C. H. Bailey.—p. 103.

Culinary Properties of Rice. The purpose of this study was to investigate the biologic and physical changes in determining and explaining the better cooking characteristics of stored rice. The relative differences in culinary quality between new and old rice could not be explained on the basis of the difference in their amylase activities. A change in the colloidal condition of the rice from the sol to the gel state during storage is believed to bring about the better cooking quality in the stored grain.

Volatile Compounds in Fresh Bread. Several volatile compounds have been recovered and identified from fresh white bread, and some of these have been estimated. Neither the actual distillate containing these compounds nor several synthetic blends of them have proved of any value in enhancing the palatability of a bland, chemically leavened bread. It appears that certain products of fermentation, not necessarily the same as those identified here, are essential at the time a bread dough goes into the oven and are altered by oven heat (both in nature and amounts) to give rise to the actual constituents of flavor.

Rice Polishing and Mineral Metabolism. It is well known that the polishing of rice leads to extensive loss of minerals and B vitamins; hence, the use of undermilled rice is recommended in India. Also for economy, completely unpolished rice is often given in the diet. Against these apparent advantages, brown rice or undermilled rice has poor storage and cooking qualities and contains large amounts of phytic acid which interferes with the utilization of dietary calcium. In this study, negative cal-

cium balances were recorded in human subjects when brown rice or rice polished to remove 2.9 per cent of the brown rice was fed as the cereal portion in a poor vegetarian diet. Rice polished to remove 4.1 or 6.3 per cent of the brown rice produced slight positive calcium balances. The brown rice did not produce higher nitrogen or phosphorus balances than the polished rice samples. Rice polished to remove 4.1 per cent of the brown rice represented a *via media* stage of polishing with 1.7 gamma per gram thiamine and could be recommended for consumption by rice eaters.

Irradiation of Wheat Flours. The changes brought about by irradiation of flours from thirteen varieties of wheat are reported and the results given in tabular form. As expected, flours from all varieties after irradiation showed decreased gluten recoveries and increased maltose values. There were considerable similarities in the magnitudes of these changes. Irradiation caused decreases in the albumin and gluten fractions and increases in the fractions containing the water-soluble and alkali-soluble nonprotein nitrogen, thus strongly indicating breakdown of the proteins by gamma rays.

FOOD RESEARCH

Vol. 25, January-February, 1960

*Temperature relationships and some other characteristics of the microbial flora developing on refrigerated beef. J. C. Ayres. —p. 1.

*The effect of storage on ascorbic acid content of gamma radiated potatoes. T. Panalaks and O. Pelletier.—p. 33.

*Biochemistry of chicken muscle as related to rigor mortis and tenderization. D. de Fremery and M. F. Pool.—p. 73.

*Some factors contributing to the stability of fat in chilled doughs. C. E. Weir, A. D. Slover, J. D. Parsons, and L. R. Dugan.—p. 120.

*Effect of addition of antioxidants to frozen ground beef. H. M. Caldwell, M. A. Glidden, G. G. Kelley, and M. Mangel.—p. 139.

*Studies on ascorbic acid retention in frozen juice, segments, and while oranges. A. J. Tingleff and E. V. Miller.—p. 145.

Microbial Flora on Refrigerated Beef. This study is an attempt to evaluate the role of the pseudomonads and other bacteria in producing the off-odors and slime which limit storage life of refrigerated sliced beef. Growth curves were obtained for numbers of organisms surviving on beef stored at various temperatures. The initial load of organisms determined the time required for development of slime. Most of the bacteria on stored meats had lipolytic activity; from one-third to two-thirds liquefied gelatin. Oxidase production could not be determined accurately. From 4 to 20 per cent of the initial population were chromogens, and fluorescent bacteria comprised 10 to 25 per cent of the flora throughout storage. Microorganisms isolated from refrigerated beef were classified. At 10°C. or lower, the bacteria causing slime were almost without exception pseudomonads.

Ascorbic Acid and Irradiated Potatoes. Levels of gamma radiation did not cause consistent or large variation in the ascorbic acid content of potatoes. The main cause of loss of ascorbic acid was storage. Storage at 40°F. resulted in lower ascorbic acid values than storage at 68°F. Low ascorbic acid content caused by low temperature storage could be partially restored by reconditioning, suggesting that some of the ascorbic acid had been reversibly oxidized.

Tenderization of Chicken Muscle. The rate of development of rigor mortis and related biochemical changes in chicken muscle were studied in relation to their effect on the ultimate tenderness of cooked muscle. There was a correlation between loss of adenosine triphosphate (ATP) and onset of rigor mortis. Every treatment that resulted in more rapid loss of ATP, more rapid drop of *p*H, and more rapid loss of glycogen also induced increased muscle toughness. Injection of sodium monobromoacetate, which causes rapid loss of ATP but only a small decrease in *p*H and glycogen, failed to induce toughness in this study.

Stability of Fat in Chilled Doughs. Factors contributing to the stability of fat in chilled doughs were studied. The stability of the fat system in pastry was not affected by: baking prior to low temperature storage, the percentage of fat in the pastry, or the storage temperature between −10°F. and 20°F. Citric acid or propyl gallate added to the lard had no beneficial effect on fat stability, but the addition of either butylated hydroxyanisole (BHA) or butylated hydroxytoluene (BHT) markedly extended the fat stability of the pastry. A combination of BHA and BHT was even more effective. The stability of the fat varied throughout the thirty-six week storage period, but there was no marked overall loss in stability.

Anti-Oxidants in Frozen Ground Beef. The effect of several anti-oxidants used singly and in combination with the sodium ascorbate, on the color and flavor of frozen ground beef was investigated. Ascorbate used alone or in combination with other anti-oxidants maintained a good color in thawed beef after six weeks' frozen storage. The greening reported by early workers was not observed under the conditions reported here. The anti-oxidants other than ascorbate failed to protect the color of meat during frozen storage. With one exception, the anti-oxidants appeared to have little effect on the flavor of the meat.

Ascorbic Acid Retention in Frozen Orange. Valencia oranges from Florida were prepared as whole peeled fruits, segments, and juice and stored at 0°F. for six months. Analyses at the end of each month of storage showed a steady loss in ascorbic acid for whole fruits, segments, and juice. No significant differences were found in rate of loss, whether the material was stored as juice, segments, or whole peeled oranges. The reason for these losses in storage is not clear.

FOOD TECHNOLOGY

Vol. 14, February, 1960

*Consumer quality of selected muscles of raw and cooked pork. O. M. Batcher and E. H. Dawson.—p. 69.

*Effect of temperature on stability of frozen cakes. J. W. Pence and M. Heid.—p. 80.

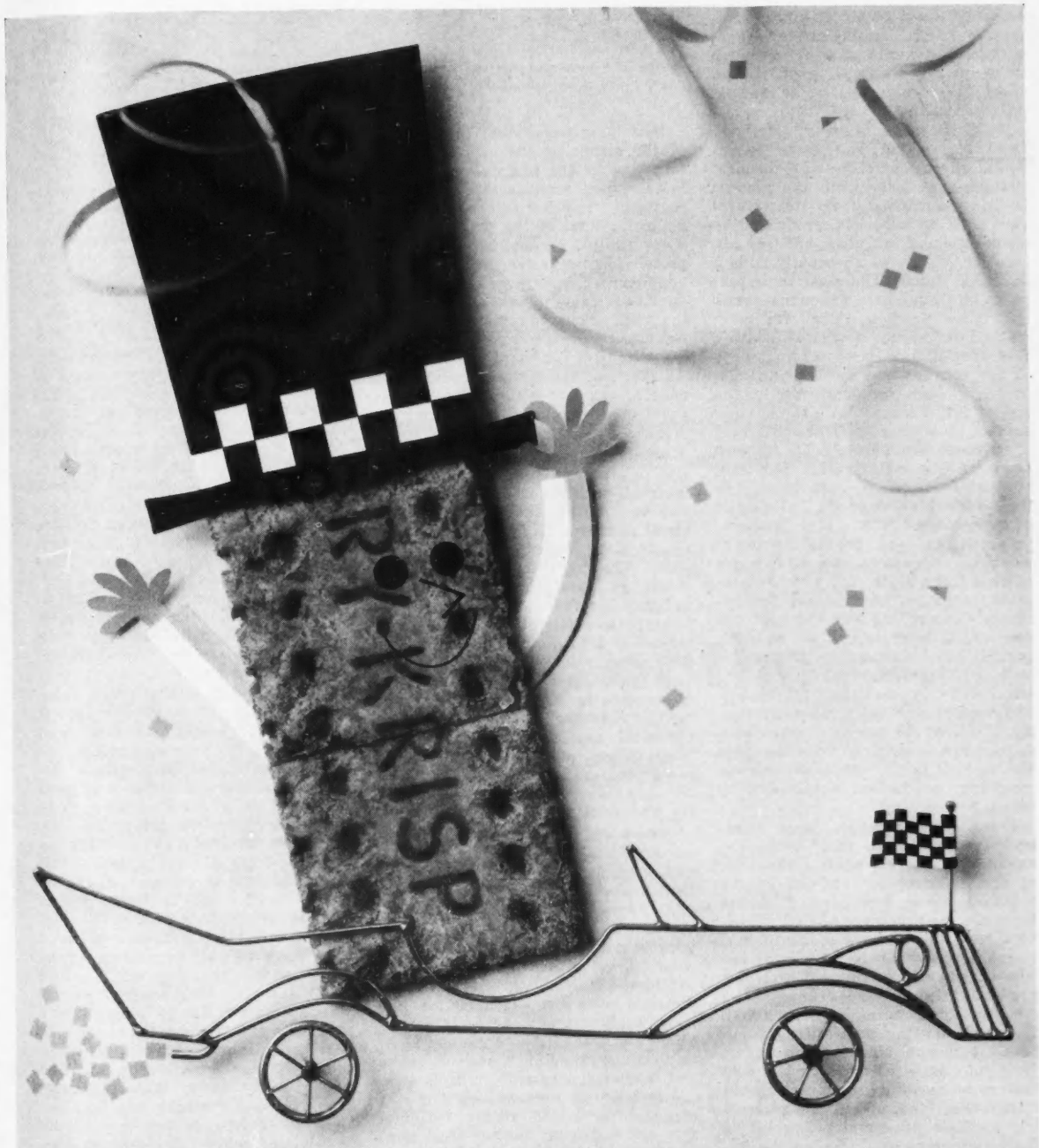
*Heat transfer in hot fat cooking. H. L. Smith, Jr.—p. 84.

Problems in the preparation and handling of hot vended canned foods. G. T. Peterson, J. F. Fox, and L. E. Martin.—p. 89.

*Comminuted orange: a novel process for its manufacture. J. B. S. Braverman and A. Levi.—p. 106.

Meat Quality. The complex problem of ascertaining the tenderness and flavor of cooked meat from the characteristics of raw meat needs to be evaluated. Variations in the quality of pork loin have been reported, but little is known of the comparative quality of various pork muscles. The investigation reported here was made (a) to compare the quality of cooked pork from carcasses of hogs varying in fatness, (b) to determine the variations which might be encountered among raw and cooked pork muscles, and (c) to ascertain which muscles might be used as indices to the qualities of hog carcasses varying in fatness. The degree of marbling in the raw *longissimus dorsi* muscle between the tenth and eleventh ribs shows promise as a means of predicting the tenderness and juiciness of cooked loin and ham cuts of pork. It would appear, however, that more than one muscle should be used to evaluate the quality of a cut because muscles vary so greatly.

Stability of Frozen Cakes. Cakes are well adapted to freezing preservation. Several reports attest to the relative tolerance that cakes have toward variations in freezing and defrosting practices that are so important with bread and related items. This paper is concerned with time periods required for detectable organoleptic changes to occur in five kinds of cakes held at different refrigerated or subfreezing temperatures. Textural changes in the frozen cakes were generally detected before changes in flavor. Principal textural changes were loss of original crumb resiliency and increases in crumbliness and harshness. Flavor declined gradually to yield increasingly bland products. Yellow and chocolate layer cakes exhibited relatively good stability at 10°F. and greatly improved stability at 0°F. However, little gain in stability was obtained at −10°F. and −30°F. Layer cakes seemed to soften and become more moist at 0°F. or below, finally deteriorating into an unacceptable gumminess or pastiness. Layer cakes were the most stable of the cakes studied. Pound cakes at 0°F. and below rapidly developed differences in texture, but the initial loss of resiliency and increased firmness later appeared to become overshadowed by increased tenderness as the cake became more crumbly. All types



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of cake showed highly significant differences from freshly baked cakes within four weeks at 0°F., although their quality was still good. In all cases, they were superior to day-old unfrozen cakes.

New Dry-Fat Frying Methods. Deep-fat cooking has three coincidental effects on foods: (a) chemical changes that occur while the product is being converted from its natural raw state to a cooked product; (b) evaporation of moisture, and (c) absorption of fat, which usually adds a desirable flavor. The relative importance of these three functions varies with the product. The Smitherm method of indirect heating of cooking fats was developed to eliminate defects in the conventional method, e.g., destructive high temperatures in the film of fat in contact with the heating surface, low thermal efficiency, lack of temperature control. The advantages of this method are: (a) substantial reduction in heat damage to the cooking fat since the fat cannot come in contact with a high temperature surface, (b) product improvement due to reduced rate of increase of free fatty acids, (c) precise temperature control and means for accurately controlling both the inlet and the outlet temperature of the fat regardless of fluctuations in product load, (d) substantial fuel savings, (e) multi-cooker operations, (f) safety and comfort, and (g) increased capacity. At least 50 per cent more production can be obtained from the same size cooking kettle compared with the maximum production obtained with direct fire cooking.

Comminuted Orange. Since citrus peels contain more than twice the amount of ascorbic acid of the juice of the endocarpium and all of the essential oil is incorporated in the flavedo, some producers of citrus products have tried to make use of this resource. One way is to convert the whole of the citrus fruit into an edible product. "Comminuted orange" is a recently coined term introduced into the trade dealing with citrus products. It means transforming citrus fruit into paste of more or less fine texture by means of some sort of disintegration. Most of the manufacturing methods of comminuting citrus fruit at present are based on the following steps: either whole citrus fruits, or the peel alone, or various proportions of juice, rag, and peel are mechanically disintegrated and milled to a fine colloidal paste using suitable milling equipment. In some cases, the milling is preceded by cooking the peel in double-jacketed stainless steel tanks to soften it before comminution. This article describes an improved method of comminuting citrus fruit.

JOURNAL OF THE AMERICAN GERIATRICS SOCIETY

Vol. 8, February, 1960

•Methods for improving operability in the aged. W. H. Harridge and W. H. Cole.—p. 79.

•The lability of bone mineral. R. V. Bennett.—p. 92.

Vol. 8, March, 1960

•Stress and hyptertension: use of antistress diet and antihistamine. D. G. Lipman.—p. 177.

Improving Operability in the Aged. Major emphasis should be given to nutrition in the pre-operative period in the aged. An intensive nutritional regimen consisting of an oral intake up to the level of the patient's maximum ability, parenteral injection of protein hydrolysates, tube feedings administered during the night (if they do not seriously impair appetite), and the intravenous administration of fat emulsion is recommended by this team of surgeons. Therapy with ACTH, which improves appetite and gives a general sense of well-being, is sometimes used. Several case histories are presented.

Lability of Bone Mineral. Bone mineral is a highly labile fraction of the internal environment and reacts rapidly to maintain the balance of electrical particles. High dietary calcium intake is not reflected in urinary calcium. The high incidence of renal stones in paralytics and bedridden patients should be considered in two lights: (a) dissolution of cells with release of a flood of intracellular ionic phosphate, and (b) stasis. Osteoporosis, as presently used, is a purely descriptive term. The condition may well be the result of an imbalance of electrical particles. The polyatomic bone crystal during the process of maturation and dissolution must pass through stages of both relative stability and relative instability.

Stress and Hypertension. By using an antihistamine and an antistress diet, it was possible to maintain nineteen previously disabled hypertensive civil service employees in full-duty status with a minimum of illness and with a gradual lowering of the diastolic blood pressure for periods up to thirty-six months. The antistress diet is a basic diet which fortifies the body against the wear and tear of stress situations. No irritants, such as tobacco; stimulants, such as coffee and tea; or depressants, such as alcohol and drugs, are allowed. The diet contains no added sodium. Animal fats are restricted to the barest minimum. Chicken and lean fish are encouraged, and a high intake of whole-grain cereals, citrus fruits, and green and leafy vegetables was recommended as a ready source of plant amino acids and essential vitamins and minerals.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 172, February 6, 1960

•Overuse of milk in the diets of infants and children. C. A. Smith. Council on Foods and Nutrition.—p. 567.

Vol. 172, February 13, 1960

•Tables of average weight and height of Americans aged 65 to 94 years. Relationship of weight and height to survival. A. M. Master, R. P. Lasser, and G. Beckman.—p. 658.

•Vitamins in beer. Foreign Letters–Germany.—p. 726.

Vol. 172, February 20, 1960

•Periodontal disease and diabetes in young adults. R. C. Williams, Jr., and C. J. Mahan.—p. 776.

Comparison of acute hypoglycemic potencies of tolbutamide and chlorpropamide. J. W. Craig. M. Miller, F. D. Mills, and N. Nickerson.—p. 77.

•Infant feeding. Foreign Letters–United Kingdom.—p. 850.

Vol. 172, February 27, 1960

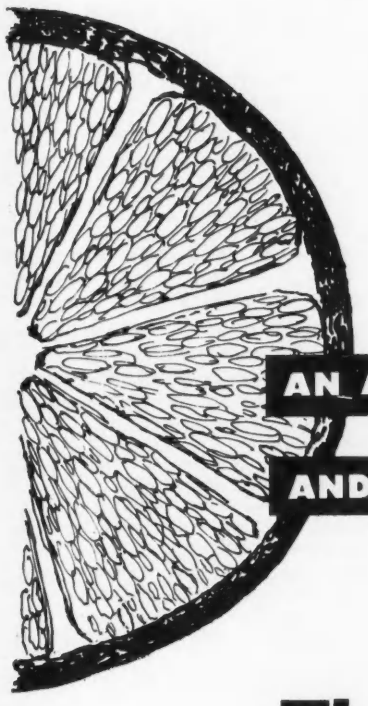
•Current status of therapy in microbial food poisoning. G. M. Dack. Council on Drugs—p. 929.

•Immune milk for arthritis. Questions and Answers.—p. 990.

Overuse of Milk. Milk as a food for the growing child should be considered only in relationship to the needs of the child for protein, calcium, and iron and the amounts of these nutrients in milk. The child of one to three years of age who receives all or most of his caloric requirements from milk will get only a small fraction of the iron his growing body needs. Iron deficiency anemia is seen almost as often today as it was twenty years ago. Such errors, which may result from medical emphasis on unlimited consumption of any good food, should be avoided by following good principles of nutrition. Normally, the milk intake recommended can be somewhere between 2 and 4 cups.

Weight and Height of Older Americans. A table of average weight at each inch of height, for persons of each sex, in five-year age groups, has been presented for the population between sixty-five and ninety-four years of age. This is the first table to be constructed for this group. The current study involved apparently healthy subjects in the U. S. The data should prove valuable in research on the relationship of weight to disease and as a guide for weight control in the older population. After sixty-five years of age, mean weight decreases progressively with advancing age in both sexes at every inch level of height. This decrease is due to a loss of body substance and to reduction in the proportion of overweight subjects by a relatively higher mortality. From the age of sixty-five to that of ninety-four years, overweight men decrease from 30 to only 10 per cent of the population, while underweight men increase in frequency from 20 to 50 per cent. At the same ages, overweight women decrease from 40 to 10 per cent, while underweight women increase from 20 to 55 per cent. This emphasizes the favorable survival rate of underweight persons. In the older age group, ± 20 per cent variation from the mean is too broad a criterion for normal; only a ± 10 per cent variation in weight should be considered healthy. There is little or no change in average height in older people. Tall persons seem to have as satisfactory a survival rate as shorter ones.

Vitamins in Beer. Analysis of various types of beer showed that they



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have a relatively high B-vitamin content. Experiments with animals showed that a definite increase in growth, confirmed statistically, resulted when they were given small quantities of beer. Microbiologic assay of beer gave the following values per liter: 9 to 700 mcg. thiamine; 140 to 800 mcg. riboflavin; 8.5 to 23 mcg. niacin; 0.6 to 2 mg. pantothenic acid; and 180 to 1700 mcg. vitamin B_6. Pasteurization produced only a slight decrease in the vitamin content.

Periodontal Disease and Diabetes. Seven of nine patients with diabetes and periodontal disease who underwent elective periodontal therapy showed significant subsequent reduction in insulin requirement. It is the clinical impression in this study that diabetes and chronic, destructive periodontal disease are separate entities. Diabetes may be adversely influenced by the presence of periodontal disease, and conversely periodontal disease may be more severe in the diabetic state. It is concluded that treatment of oral pathology by elective periodontal surgery and extractions where indicated may improve the practical regulation of diabetic patients.

Infant Feeding. In a report by the Medical Research Council, normal standards of weight and hemoglobin and serum protein levels of breast-fed and artificially fed infants were established for the first eighteen months of life from studies on 521 full-term and 223 premature infants. The incidence of infection was the same in both breast-fed and artificially fed infants, and there was no significant difference in the weights or in the protein levels of the two groups. It was felt that breast milk is inadequate for premature infants. Although no physiologic or nutritional advantages in breast feeding was demonstrated, it was considered highly desirable because of the natural emotional relationship it establishes between mother and child.

Microbial Food Poisoning. Microbial food poisoning falls into two principal categories. The first is one in which the causative microbes grow in a food and elaborate an exotoxin, for example, botulism and staphylococcus food poisoning. The second is one in which the causative living organisms multiply in a food product, and large numbers are required to produce infection. Examples of this group are Salmonella infections and food poisoning from certain streptococci and from *Bacillus Cereus* and *Clostridium Perfringens*. These various types of microbial food poisoning are discussed, and a table giving essential features, such as symptoms and onset after eating, is included.

Immune Milk for Arthritis. Immune milk is not recommended as a therapeutic agent for the management of patients with rheumatoid arthritis. This treatment is based on several unproved hypotheses. It assumes that the disease is caused by deposition of an insoluble antigen in the tissues of the joint and that this substance comes from streptococcic organisms. The streptococcic antibodies are produced in the cow, and when the patient ingests immune milk, it is also assumed that the antibodies are assimilated so that when they reach the joints, an antibody-antigen complex is formed.

THE JOURNAL OF CLINICAL INVESTIGATION

Vol. 39, January, 1960

*Pyrimidine metabolism in man. III. Studies on leukocytes and erythrocytes in pernicious anemia. L. H. Smith, Jr., and F. A. Baker.—p. 15.

The esterification of palmitate-1-C^{14} by homogenates of intestinal mucosa. A. M. Dawson and K. J. Isselbacher.—p. 150.

*Progesterone effects on galactose metabolism in prepubertal patients with congenital galactosemia and in rats maintained on high galactose diets. L. A. Pesch, S. Segal, and Y. J. Topper.—p. 178.

Pyrimidine in Pernicious Anemia. Three enzymes leading to the synthesis of orotic acid—aspartate carbamyltransferase, dihydroorotase, and dihydroorotic dehydrogenase — were studied in the erythrocytes and leukocytes of ten patients with pernicious anemia in relapse. Increased activities of aspartate carbamyltransferase and dihydroorotase with normal activity of dihydroorotic dehydrogenase were found. This pattern differs from that found in immaturity of cells *per se*. The abnormal pattern returned to normal following treatment with vitamin B_{12}. It is suggested that the enzyme abnormalities are most consistent with the pattern of "pyrimidine starvation" produced by vitamin B_{12} deficiency. The competitive inhibition of aspartate carbamyltransferase by cytidine-t'-phosphate was confirmed in *Escherichia coli* but could not be demonstrated in erythrocytes or leukocytes.

Esterification of Fatty Acid by the Intestine. In both rat and human experiments, homogenates prepared from the duodenum or jejunum, which are the usual sites of fat absorption, were four to five times as active as those from the ileum or colon. Mucosa from the jejunum of patients with idiopathic steatorrhea had a greatly diminished capacity to esterify palmitate-1-C^{14}. It is suggested that a mechanism similar to the one described *in vitro* is involved in the esterification and absorption of long chain fatty acids by the intestine *in vivo*.

Progesterone and Galactose Metabolism. Administration of progesterone to three prepubertal patients with congenital galactosemia resulted in a significant increase in the ability to oxidize a tracer dose of galactose-1-C^{14} to $C^{14}O_2$. Futhermore, administration of progesterone to young male rats maintained on high galactose diets caused a delay in the onset and a decrease in the daily incidence of cataract formation. These observations are discussed in light of *in vitro* effects of progesterone and in terms of possible therapeutic implications in congenital galactosemia.

JOURNAL OF HOME ECONOMICS

Vol. 52, January, 1960

*Frozen precooked beef with gravy. V. D. Bramblett.—p. 29.

*Electronic cookery of top round of beef. N. Harshall.—p. 31.

How to gain summer experience in hospital dietetics. H. M. Davis.—p. 40.

Vol. 52, March, 1960

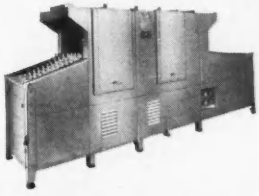
*Electronic cooking of fresh and frozen broccoli. V. J. Chapman, J. O. Putz, G. L. Gilpin, J. P. Sweeney, and J. N. Eisen.—p. 161.

*Food marketing practices of older households. G. J. Bymers and J. Murray.—p. 172.

Frozen Precooked Beef. The object of this study was to prepare a highly acceptable precooked, frozen meat product with a satisfactory sauce or gravy. The research is significant, since many frozen gravies and sauces curdle and separate; nevertheless, inclusion of gravy with cooked meat is desirable, since dehydration and oxidation are minimized. Details of the experiment are given. A satisfactory product was obtained by freezing slices of precooked meat with a gravy made from the diluted drippings. Test panel scores indicated that it made little difference whether the gravy was salted (salt has been thought to contribute to the curdling of sauces). Meat cooked at 63°C. for 30 hr. was scored higher on all factors than meat cooked at 68°C. for 18 hr.

Electronic Oven in Meat Cookery. The electronic range has many appealing features—speed of cooking, ease of cleaning, food preparation in serving dishes, cool container and oven. As with all new equipment, however, research is needed to determine the scope and limitations of use. This report deals specifically with meat cookery. It was found that the electronic oven was unsatisfactory for roasting a Choice grade top round of beef to well-done because of high losses and low palatability. An acceptable product was obtained by variations in method, such as covering the meat, protecting portions with foil, or preparing a stew with cubes of meat. The homemaker will need to decide whether the total time saved is worth the decrease in quality and quantity and the extra attention needed in cooking less tender cuts of beef to well-done.

Electronic Cooking of Broccoli. Fresh and frozen broccoli were cooked in a home-type electronic range to investigate the effect of microwave cooking on palatability and nutrient content. Results were compared with those of previous studies in which broccoli was cooked by conventional methods. Cooking broccoli stems to optimal tenderness electronically took about 6 min. per pound of *fresh* broccoli compared with 13 min. by boiling; 13 min. for 20 oz. of *frozen* broccoli compared with 11 min. conventionally. With both methods, flavor was about the same. There were no measurable losses of carotene using the microwave



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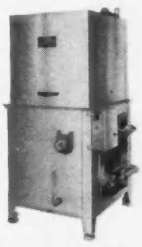

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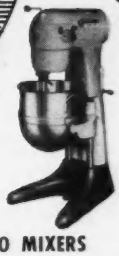

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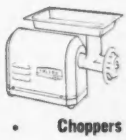

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method. Ascorbic acid retentions were higher in the broccoli cooked electronically. Cooking in the electronic range took about 0.06 kilowatt-hour per minute; boiling, about 0.024 kilowatt-hour.

Marketing Practices of Older Households. Information on marketing practices was part of a food consumption survey made among selected Old Age and Survivors Insurance beneficiaries in Rochester, New York, in 1957. Information was provided by 109 one-person households and 173 two-person households. There is little to suggest that marketing was a problem. Generally, these people did their own marketing, patronized price-competitive stores, preferred those nearby, shopped rather infrequently, and had adequate storage facilities. Food expenditures varied widely. Minor differences in marketing practices did exist among household classified according to nutritive level.

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION

Vol. 33, November 16, 1959

*Study of Bitot's spot with special reference to protein malnutrition. K. Bagchi, K. Halder, and S. R. Chowdhury.—p. 401.

Vol. 33, December 16, 1959

*Field investigations of lathyrism in Uttar Pradesh. K. K. Govil, B. M. Gupta, S. D. Kapur, N. C. Chakravarty, D. P. Bhatnagar, and K. C. Pant.—p. 499.

*The role of potassium deficiency in surgical patients: its recognition and management. S. P. Srivastava and H. L. Khanna.—p. 507.

Bitot's Spot and Protein Malnutrition. This investigation deals with the genesis of Bitot's spot and factors operating in the development of these triangular foamy patches. The present concept of a vitamin A-deficient diet is no longer tenable. Simple vitamin A deficiency in an otherwise healthy body may not give rise to Bitot's spot. However, vitamin A deficiency, superimposed on protein malnutrition, might be responsible for Bitot's spot. The hypothesis is strongly confirmed by clinical response obtained after a combined therapy with vitamin A and protein, whereas treatment with vitamin A alone even in large doses failed.

Lathyrism in India. Lathyrism has been recognized in Europe over three hundred years ago and was ascribed to the ingestion of the seeds of various species of the genus lathyrus. With the improvement of economic conditions and the change in dietary habits, it is now rarely seen in Europe, but in India, it has been prevalent for at least as long as written records of Indian history exist. In this paper, the epidemiologic features, the nutrition status, the biochemical findings, and the therapeutic trials in field investigations of 563 cases of lathyrism in Uttar Pradesh are given. Lack of adequate nutrients in the diet lowers the general body resistance. It is suggested that methionine deficiency may contribute some part of the causative factor of the disease. Lack of ascorbic acid, which normally detoxicates the toxin entering the system from the consumption of the lathyrus pulse, is also a possible part of the causative factor. Until the epidemiology of the disease is fully understood, reorientation of the agricultural practice and health education of the people are the main remedial measures against this disease, along with the improvement of the economic condition of the area.

Potassium Deficiency in Surgical Patients. Fifty surgical cases were observed. In most of the cases after an operation of any severity, the serum potassium level showed a definite fall. Dehydration was a major factor in producing an excess of potassium loss. The extent of potassium loss is directly proportionate to the degree of tissue damage and the severity of operation which leads to a greater adrenocortical response, which leads to sodium conservation and potassium excretion.

JOURNAL OF THE NEW ZEALAND DIETETIC ASSOCIATION

Vol. 13, December, 1959

*Conference address. G. N. Davies.—p. 11.

Role of the home economist and dietitian. E. N. Todhunter.—p. 14.

Cultural Aspects of Changing Food Habits. A professor of preventive dentistry points out that in order to change peoples' dietary habits, we must first learn why people eat as they do and what is the importance of existing food habits in the general cultural and social context. It is not merely a question of teaching new facts, but one of educating the people to find a place for these changes in their systems of values and beliefs. The ability of man to adapt his way of life and his metabolism to his total environment is sufficiently marked to keep nutritionists humble in their knowledge of the requirements of even the most essential of the known nutrients.

THE JOURNAL OF NUTRITION

Vol. 70, February, 1960

*Supplementation of cereal proteins with amino acids. III. Effect of amino acid supplementation of wheat flour as measured by nitrogen retention of young children. R. Bressani, D. L. Wilson, M. Behar, and N. S. Scrimshaw.—p. 176.

*The growth, breeding and longevity of rats fed irradiated or non-irradiated pork. E. C. Bubl and J. S. Butts.—p. 211.

Effect of saturated and unsaturated fatty acids on dietary lipogranuloma. D. C. Herting, P. L. Harris, and R. C. Crain.—p. 247.

*The effect of diet on growth rate and feed efficiency in the normal rat. C. H. Lushbough and B. S. Schweigert.—p. 252.

*Diet-type (fats constant) and blood lipids in man. A. Keys, J. T. Anderson, and F. Grande.—p. 257.

*The vitamin C status of alcoholics. D. Lester, R. Buccino, and D. Bizzocco.—p. 278.

Amino Acid Supplementation of Wheat. The results of the supplementation of wheat flour with essential amino acids in the proportions of the FAO "reference protein" are described. The observations were made on hospitalized children who had recovered from severe protein malnutrition. Comparison of the essential amino acid pattern of the basal wheat diet to the FAO "reference protein" showed that the order of the limiting amino acids was: lysine, tryptophan, methionine, isoleucine, valine, and threonine.

Irradiated Pork and Rat Growth. Pork irradiated at two levels was fed to rats to determine the wholesomeness of irradiated foods. The remainder of the diet was non-irradiated and was considered nutritionally adequate. Over a four-generation, two-year study, no statistical differences were obtained in growth, breeding, and longevity of the rats.

Diet, Growth Rate, and Feed Efficiency. Long-term studies of the effect of the level of dietary protein and fat on the rate of body weight gain and on the caloric efficiency of feed utilization in male rats are described. When rations based on casein, sucrose, and lard or corn oil were fed *ad libitum*, the rate of body weight gain and the caloric efficiency of feed utilization increased with progressive increases in protein:calorie ratios, and further increases were observed for each protein:calorie ratio studied, when the fat:calorie ratio was increased by a factor of four. Dilution of the experimental rations by the addition of either fat or sucrose resulted in decreased response and efficiency when protein was limiting for growth, but such dilution was without effect at higher protein levels.

Diets and Blood Lipids. Controlled experiments were carried out on men with diets differing in the proportions of carbohydrate calories supplied from various food sources. Sucrose and milk sugar tended to produce higher serum cholesterol values than equal calories of carbohydrates contained in fruits, leafy vegetables, and legumes. Serum cholesterol averages were 16 mg. per 100 ml. and 19 mg. per 100 ml. lower on the diet high in fruits and vegetables. These differences were statistically highly significant.

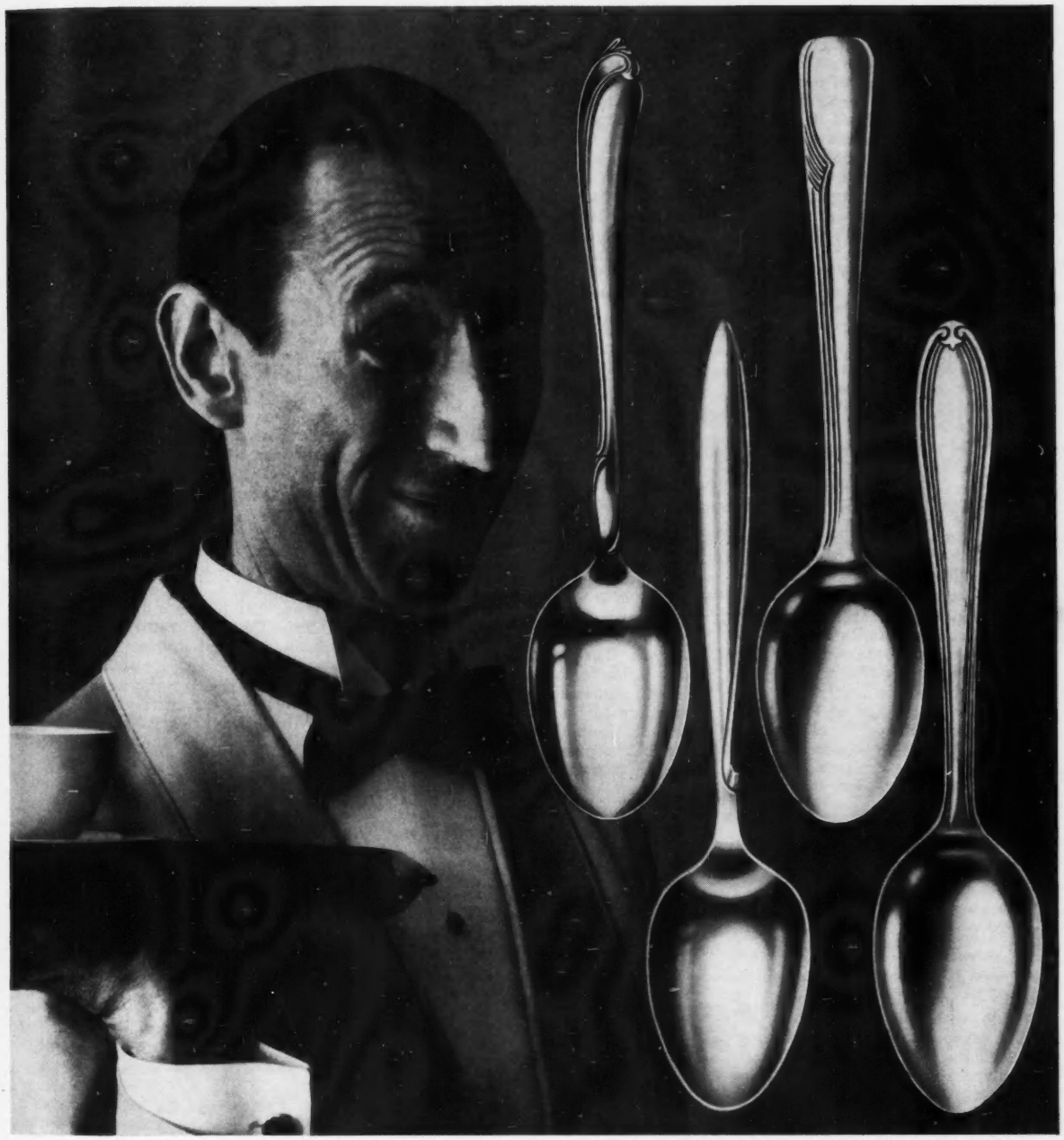
Ascorbic Acid Status of Alcoholics. The ascorbic acid status of alcoholics, as assessed by the urinary excretion of oral, test doses, was compared with that of non-alcoholics. Significantly more alcoholic patients were deficient in ascorbic acid, although a significant proportion of non-alcoholics were deficient. Daily supplementation with 250 mg. ascorbic acid was inadequate to correct the initial deficiency in the alcoholics. At least 500 mg. daily for a week were required before placing them on a maintenance regimen.

THE JOURNAL OF PEDIATRICS

Vol. 56, February, 1960

*Role of the kidney in water metabolism in young infants. C. M. Edelmann, Jr., and M. L. Barnett.—p. 154.

Water Metabolism in Infants. Present evidence indicates that the diluting mechanisms of the infant and adult kidney function qualitatively and are



Left to right: SHASTA,* TAPER,* both extra-heavy; VALOR,* PARADE,* both heavy.

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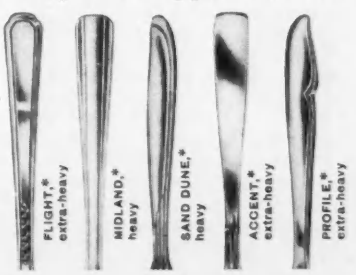

probably quantitatively the same. Comparison of the infant and adult response to water loading is at best difficult, primarily because of a lack of adequate standards of comparison. However, the infant seems to show a lesser degree of diuresis in response to water loading than the adult, probably because of lower rates of solute excretion and glomerular filtration. Recent observations in infants and adults have demonstrated the importance of the role of dietary protein and water in the concentrating mechanism. The large daily fluid intake of the infant, uniquely distributed throughout the entire 24-hr. period, and the low rate of urea excretion, due to a strongly positive nitrogen balance, make consideration of the diet especially important. Obligatory urinary water depends on the balance between maximal achievable urine osmolality and the rate of solute excretion, both of which are influenced to a major extent by dietary protein content. Obligatory renal water for a given diet cannot be predicted but must be measured. Studies have demonstrated that with adequate water intake or with complete food and water deprivation, no significant difference in the rate of renal water excretion can be demonstrated in infants fed high- or low-protein diets. Data concerning the role of the kidney in water metabolism have been interpreted as demonstrating an advantage of low-protein feeding. The role of renal function, in the definition of optimal protein intake for young infants has been assigned disproportionate importance.

THE LANCET

No. 7116, January 16, 1960

*Skin changes in hypocalcaemia. C. E. Dent and M. Garretts.—p. 142.

*Overweight in pregnancy. A. Mullins.—p. 146.

*Total exchangeable potassium in infantile malnutrition. R. Smith and J. C. Waterlow.—p. 147.

Skin Changes in Hypocalcemia. In patients with diseases of three different etiologies, severe skin changes were closely associated with temporary hypocalcemia. In each case, dramatic improvement occurred, often repeatedly, when the plasma (or serum) calcium became normal or was restored to normal with vitamin D, parathyroid hormone, or calcium-gluconate injections. These facts are considered to be highly suggestive of a close association between "skin health" and plasma-calcium levels in certain patients.

Overweight in Pregnancy. Experience in treating obesity has shown that advice, however sound, is seldom sufficient for satisfactory weight loss when it is given only once. The patient must be seen at short intervals to re-inforce and repeat the advice and to encourage, praise, or admonish. In difficult cases, it is often necessary to discuss in detail the patient's eating habits, to vary the diet in accordance with his life circumstances, to suggest recipes and methods of food preparation, and to encourage him to try new articles of food. Repeated encouragement and advice are especially necessary in such cases because long-standing habits are hard to change and the attempt often causes the patient much anxiety. These principles have been applied successfully to patients with excessive weight gain in pregnancy, not controlled by advice in the antenatal clinic. Since pregnancy is a common starting-point of obesity in later life, the control of excessive weight gain in pregnancy is important, not only for the outcome of the pregnancy, but also for the future health of the patient.

Potassium in Infantile Malnutrition. One characteristic of severe protein malnutrition in infants is a profound electrolyte disturbance. In this study infants with severe chronic malnutrition were measured for the total exchangeable potassium by the isotope-dilution method. Exchangeable potassium per unit body weight was reduced by 24 to 30 per cent. After recovery, normal levels were found. The reduction in exchangeable potassium was accompanied by a loss of potassium from muscle, and by inability to produce an acid urine in response to a test dose of ammonium chloride. The serum-potassium level is no guide to the extent of depletion of body potassium. In treatment, it is necessary to continue potassium supplements for at least ten days, since even in the presence of depletion, potassium is incompletely retained.

THE LICENTIATE

Vol. 9, December, 1959

*Malnutrition. Major cause of blindness in children. C. Gopalan.—p. 270.

Vol. 9, January, 1960

*Diet, cholesterol and atherosclerosis. M. H. Stiles, R. T. Pearson, and R. S. Johnson.—p. 306.

Malnutrition and Blindness in Children. The tragedy of malnutrition in children in India is not so much that it is responsible for high mortality, but that it cripples and permanently damages the growing generation. Of the many crippling effects, probably the most devastating is on vision. It is believed that the most common cause of preventable blindness is malnutrition due to a dietary deficiency of vitamin A. This becomes an important public health problem in many parts of the country, especially in South India and Bengal.

Diet, Cholesterol, and Atherosclerosis. Most of this study is centered around diet in relation to atherosclerosis. Serum cholesterol levels may be altered by changes in diet, but neither cholesterol levels nor atherosclerosis have been controlled consistently by dietary restriction of fat. It is not even entirely clear that reduction of cholesterol will arrest or reverse the atherosclerotic process. It is reasonably hoped that definitive answers will be available within the next few years.

NEW ENGLAND JOURNAL OF MEDICINE

Vol. 262, February 11, 1960

*Lycopenemia. A variant of carotenemia. P. Reich, H. Shwachman, and J. M. Craig.—p. 263.

*Current concepts in therapy. Hypoglycemia agents for oral administration. II.—p. 297.

Vol. 262, February 18, 1960

*Occurrence of goiter in an infant on a soy diet. J. D. Hydovitz.—p. 351.

Lycopenemia. A case of a middle-aged woman who drank excessive quantities of tomato juice that produced orange-yellow discoloration of the skin is reported. The serum carotenoids were grossly elevated, and carotenoid pigments were shown to be stored in the liver. The serum contained unusually high levels of lycopene, the red carotenoid of tomatoes. Her condition was distinguished from common carotenemia by the source of carotenoids, the color of the skin, the specific carotenoids involved, and their storage in the liver.

Hypoglycemic Agents for Diabetes. The superiority of insulin over today's oral hypoglycemic agents may be summarized as follows: Insulin is effective in both juvenile and adult-onset types of diabetes and in treatment of ketoacidosis. Insulin has a clearly demonstrable effect of returning carbohydrate, fat, and protein metabolism to normal in the diabetic patient. None of the oral hypoglycemic agents have been unequivocally demonstrated to do this. Insulin is relatively non-toxic. It is cheaper. Although insulin generally remains the drug of choice for diabetes, it is clear that a place of usefulness remains for the relatively nontoxic hypoglycemic agents, such as tolbutamide and probably phenformin. It is hoped that future developments will produce a therapy that will allow the diabetic individual an unrestricted diet and abolish the severe complications of nephropathy, neuropathy, retinopathy, and accelerated vascular lesions that still plague the diabetic population.

Goiter in Infants on Soy Diet. The appearance of thyroid enlargement in an infant maintained on a soybean extract and the subsequent disappearance of this goiter shortly after the elimination of this food are reported. The data are compatible with the observations described in laboratory animals fed soy flour. The frequent examinations of infants receiving soybean preparations, with particular emphasis on the size of the thyroid gland, might reveal an incidence of goiter that was previously unsuspected.

NURSING OUTLOOK

Vol. 8, February, 1960

*Meals à la car. E. C. Phillips.—p. 76.

Meals on Wheels. The "meals-on-wheels" program is one in which food prepared in a central kitchen is taken in a ready-to-eat state to shut-ins in their own homes. In this country, a number of cities have adopted the

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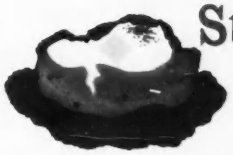
Recipes

Tomato Rarebit

(4 servings)

2 cups (½ lb.) grated Cheddar cheese
1–10½ oz. can condensed tomato soup
3 tbs. water • ½ tsp. salt
Few grains cayenne (optional) • 2 tbs. GEVRAL Protein

Combine ingredients, heat, stir frequently until cheese melts. Serve on toast or crackers.



Stuffed Baked Potato

(makes 4)

4 baked potatoes (3½" diameter) • 2 tbs. butter
2 tbs. grated onion (optional) • 2 tbs. hot milk
½ tsp. salt • ¼ tsp. paprika • 2 egg whites
½ cup (¼ lb.) grated Cheddar • 2 tbs. GEVRAL Protein

Cut hot potatoes and scoop out halves; mash thoroughly with GEVRAL Protein. Sauté onion in butter and add to pulp with milk, salt, paprika. Beat smooth. Beat egg whites stiff and fold in. Fill potato shells, sprinkle with grated cheese and broil slowly till cheese melts.

Cream Soup

(4 cupfuls)

2 tbs. butter or oleomargarine • 1 tbs. minced onion
1½ tsp. flour • ¼ tsp. salt • ⅛ tsp. paprika
1 cup milk • 1 cup bouillon or vegetable water
1 cup puréed vegetable • 2 tbs. GEVRAL Protein

Melt butter, add onions, sauté 5 min. Blend in flour, salt, paprika. Stir in milk and soup base slowly; heat to boiling. Add purée and reheat to boiling. Make GEVRAL Protein paste with a little soup; add to soup and mix.

Fruit Whip

(4 servings)

⅔ cup fruit pulp • 2 egg whites • ¼ tsp. salt
3 tbs. sugar • 1 tbs. lemon juice • 2 tbs. GEVRAL Protein

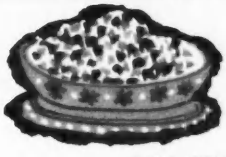
Pulp cooked fruit, or use baby-junior fruits (prunes, peaches, apples). Mix slowly, thoroughly with GEVRAL Protein. Beat egg whites stiff with salt; add sugar gradually, beat glossy. Fold in fruit, and lemon juice. (For 1 serving, mix all then add 1 portion gradually to GEVRAL Protein.

Fruit Sherbet

(4 servings)

1 cup junior pear & pineapple, canned
½ cup orange juice • ½ cup fine sugar
1 cup evaporated milk, undiluted
Few grains salt • 2 tbs. GEVRAL Protein

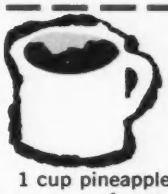
Combine fruit with GEVRAL Protein. Add juice, sugar, milk. Stir until sugar dissolves. Place in tray in freezer with control at coldest. Stir once after ½ hour. Freeze firm.



Cereals

2 tbs. GEVRAL Protein
¾ cup Cream of Wheat or 1 cup Oatmeal

Add GEVRAL Protein to cooked cereal. Or add to whole or skimmed milk over dry cereals.



Pine-Nog

(1 cup serving)

1 cup pineapple juice, canned or frozen (diluted)
1 egg • 2 tbs. GEVRAL Protein

Combine juice and egg. Gradually mix with GEVRAL Protein and stir or blend until dissolved.

Baked Custard

(4 servings)

¼ cup sugar • ¼ tsp. salt • 3 eggs • 2 cups milk
1 tsp. vanilla • 2 tbs. GEVRAL Protein

Combine sugar, salt, GEVRAL Protein: stir in beaten eggs. Add milk slowly and mix well. Add vanilla. Pour in cups and set in pan of hot water. Bake at 325° F. for 30-40 minutes or until custard sets.

Milk and fruit juices

(single ½ cup serving)

Make paste with 2 tablespoonfuls GEVRAL Protein and small amount selected liquid (whole or skim milk, tomato juice, orange juice, chocolate milk). Add remaining liquid and mix thoroughly.

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60% protein plus 26 vitamins and minerals for complete, convenient feeding

FORMULA & ANALYSIS

	High Volume Formulas (Normal Sodium Content)		
	Formula #1	**Formula #2**	**Formula #3**
BASIC INGREDIENTS:			
GEVRAL PROTEIN	60 Gm. (2 oz.)	60 Gm. (2 oz.)	60 Gm. (2 oz.)
WHOLE MILK	1 Qt.	1½ Pt.	1 Pt.
NON-FAT MILK POWDER	3 cups (405 Gm.)	2 cups	1 cup
WATER (To Volume)	2000 cc.	1330 cc.	665 cc.
TOTAL VOLUME	**2000 cc.**	**1330 cc.**	**665 cc.**
PROTEIN	214 Gm.	158 Gm.	101 Gm.
CALORIES	2340	1686	1031
SODIUM	2.67 Gm.	1.84 Gm.	1.00 Gm.
CARBOHYDRATE	272 Gm.	190 Gm.	108 Gm.
FAT	43 Gm.	32 Gm.	22 Gm.
VITAMINS:			
Vitamin A	6720 Unit	6278 Unit	5834 Unit
Vitamin D	543 Unit	532 Unit	521 Unit
Thiamine (B_1)	6.8 mg.	6.2 mg.	5.7 mg.
Riboflavin (B_2)	14.6 mg.	11.5 mg.	8.5 mg.
Niacin	20.4 mg.	18.7 mg.	16.9 mg.
Pyridoxine (B_6)	3.2 mg.	2.3 mg.	1.5 mg.
Calcium Pantothenate	22.4 mg.	16.8 mg.	11.3 mg.
Folic Acid	1 mg.	1 mg.	1 mg.
Vitamin B_{12} with Intrinsic Factor	2/15 Unit	2/15 Unit	2/15 Unit
Vitamin B_{12} (Additional)	25 mcgm.	16 mcgm.	8 mcgm.
Choline	833 mg.	581 mg.	328 mg.
Inositol	900 mg.	616 mg.	333 mg.
Ascorbic Acid (C)	88 mg.	76 mg.	64 mg.
Rutin	25 mg.	25 mg.	25 mg.
Vitamin E	10 I.U.	10 I.U.	10 I.U.
Lysine	16.4 Gm.	12.3 Gm.	8.1 Gm.
MINERALS:			
Calcium	7.26 Gm.	5.22 Gm.	3.17 Gm.
Phosphorus	5.20 Gm.	3.58 Gm.	1.97 Gm.
Iron	13.4 mg.	12.3 mg.	11.3 mg.
Fluorine	0.6 mg.	0.4 mg.	0.3 mg.
Copper	1.5 mg.	1.3 mg.	1.1 mg.
Iodine	0.2 mg.	0.2 mg.	0.2 mg.
Potassium	5.9 Gm.	4.1 Gm.	2.2 Gm.
Manganese	1 mg.	1 mg.	1 mg.
Zinc	31.5 mg.	22.1 mg.	12.9 mg.
Magnesium	600 mg.	390 mg.	210 mg.
Boron	0.1 mg.	0.1 mg.	0.1 mg.

Lederle LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

plan, and others plan to follow suit. The program described here is that of Rochester, New York. It is a three-year demonstration project administered by the Visiting Nurse Service of Rochester and Monroe County. A manual is being prepared for use by other cities. Details of the program—its objectives, basic philosophy, characteristics of the meal service itself, personnel, and clients are given.

NUTRITION REVIEWS

Vol. 18, March, 1960

*The operation of a metabolic ward. R. E. Hodges and W. B. Bean.—p. 65.

*Vascular disease and the growth, repair, regeneration and degeneration of vascular elastic membranes.—p. 67.

*Energy metabolism in malnourished infants.—p. 75.

A Metabolic Ward. In this article Drs. Hodges and Bean describe the operation of the metabolic ward at the State University of Iowa. They believe that a metabolic ward is the only facility where the subject can be controlled and provided a stable environment and a precise diet and accurate collection of specimens can be achieved. Although the cost is great, the results in terms of reliable information justify the expense.

Vascular Disease. These investigators believe that there is probably no single cause of degenerative arterial diseases or of terminal thrombosis. The final common path probably involves two independent but usually concurrent processes: (a) the vascular lesions resulting from deranged growth, remodeling, regeneration, or repair of acute injuries to arterial walls themselves; and (b) the factors in the circulating blood (influenced by diet and hormone balance) which promote or suppress localized intimal fibrin deposits, apparently most often formed over rigid intramural vascular scars.

Energy Metabolism in Malnourished Infants. Studies made in the 1920's suggested that a high metabolic rate occurred in infant malnutrition in contradistinction to more recent studies in adults which showed a decreased oxygen consumption on starvation regimens. In this study, metabolic rates in malnourished infants were increased per unit of weight because of fat losses. But, severe starvation will depress metabolic rate in infants as well as in adults.

PUBLIC HEALTH REPORTS

Vol. 75, February, 1960

*Radioactivity in fresh vegetables.—p. 146.

*Evaluation of food sanitation programs. F. G. Lynch.—p. 159.

Radioactivity in Fresh Vegetables. The Food and Drug Administration's second report on radioactivity in fresh vegetables finds the amounts still well within limits recommended by the National Committee on Radiation Protection and Measurements. The total beta radioactivity of fresh vegetable samples, by product, 1958-59; the total beta radioactivity of fresh vegetable samples, by state, 1958-59; and the strontium-90 content of fresh vegetable samples, by state, are presented in tables.

Evaluation of Food Sanitation Programs. Evaluations are essential to efficient planning in food sanitation programs. At least two methods of evaluation should be considered. The first, cost vs. value received, is merely mentioned. The second, a means of measuring achievement as progress toward a predetermined objective, is discussed in detail.

SCIENCE

Vol. 131, February 19, 1960

*Transport of strontium-90 in runoff. R. G. Menzel.—p. 499.

Vol. 131, March 4, 1960

*Zinc-65 and zirconium-95 in food. M. A. Van Dilla.—p. 659.

Strontium-90 in Runoff. Strontium-90 is deposited on soil surfaces chiefly through rainfall. The transport of strontium-90 in surface runoff was studied. Only a small portion of the strontium-90 that fell on cultivated soils was removed in runoff. The concentration of strontium-90 was usually about ten times higher in the soil carried by the runoff than in the soil from the plow layer of the plots. Thus, a considerable concentration of strontium-90 could occur in areas where runoff sediments accumulate.

Zinc-65 and Zirconium-95 in Food. Zinc-65, while not a fission product, is produced by neutron interaction with stable zinc in both bomb tests and reactors. Zinc-65 has been found in small amounts in muscle and liver samples obtained from cattle raised in Nevada, and also in commercial hamburger and beef liver from the Southwest. Zirconium-95 and niobium-95, a pair of fission-products common in fallout, were found in the liver samples but not in the muscle or hamburger. A trace of zinc-65 was detected in milk but none in people.

SOUTH AFRICAN JOURNAL OF LABORATORY AND CLINICAL MEDICINE

Vol. 5, December, 1959

*The electrocardiographic changes associated with beri-beri heart disease. An analysis of 50 cases studied at Groote Schuur Hospital, Cape Town, during a period of 5 years. V. Schrire and J. Gant.—p. 195.

Beri-Beri Heart Disease. The electrocardiographic changes occurring during sixty-two episodes of beri-beri heart failure in fifty patients are described. The electrocardiogram is of special value in the diagnosis of beriberi, particularly in areas where cases of myocardial failure of unknown origin are encountered. The findings of a normal electrocardiogram at the height of the failure in a case of heart failure of obscure origin is strongly suggestive of beri-beri heart disease and was found in 55 per cent of cases.

AMERICAN RESTAURANT

Vol. 44, February 15, 1960

*Control vital to storeroom. T. Greer.—p. 61.

GEVRAL Protein

Each 30 Gm. (2 heaping tablespoons) contains:	
Vitamin A (acetate)	2,500 U.S.P. Units
Vitamin D	250 U.S.P. Units
Thiamine Mononitrate (B_1)	2.5 mg.
Riboflavin (B_2)	2.5 mg.
Niacinamide	7.5 mg.
Pyridoxine HCl (B_6)	0.25 mg.
Calcium Pantothenate	2.5 mg.
Folic Acid	0.5 mg.
Vitamin B_{12} with AUTRINIC® Intrinsic Factor Concentrate	1/15 U.S.P. Oral Unit
Lysine	1.5 Gm.
Choline Dihydrogen Citrate	50 mg.
Inositol	25 mg.
Ascorbic Acid (C)	25 mg.
Rutin	12.5 mg.
Vitamin E (tocopheryl acetates)	5 I.U.
Calcium ($CaHPO_4$ & Calcium Caseinate)	414 mg.
Phosphorus ($CaHPO_4$)	60.9 mg.
Calcium Caseinate	21 Gm.
Ferrous Fumarate	15 mg.
Iron (as Fumarate)	5 mg.
Fluorine (CaF_2)	0.05 mg.
Copper (CuO)	0.5 mg.
Iodine (KI)	0.1 mg.
Potassium (from K_2SO_4 and Calcium Caseinate)	15 mg.
Manganese (MnO_2)	0.5 mg.
Zinc (ZnO)	0.25 mg.
Magnesium (MgO)	0.5 mg.
Boron ($Na_2B_4O_7.10H_2O$)	0.05 mg.
Carbohydrate (from malt extract and sucrose)	7 Gm.
Calories	105.3
Total Protein (Nx6.38)*	60%
Sodium	.075%
Fat not more than	2%

SUPPLIED: ½ lb. jar and 5 lb. can

*AS CALCIUM CASEINATE OF MILK ORIGIN

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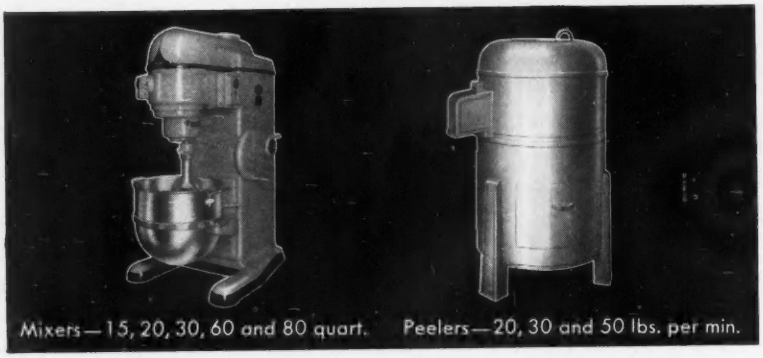
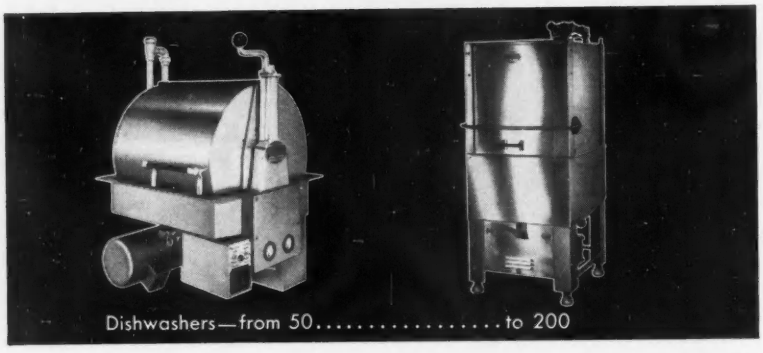


Mixers—15, 20, 30, 60 and 80 quart. Peelers—20, 30 and 50 lbs. per min.

...FOR PREPARING FOOD...



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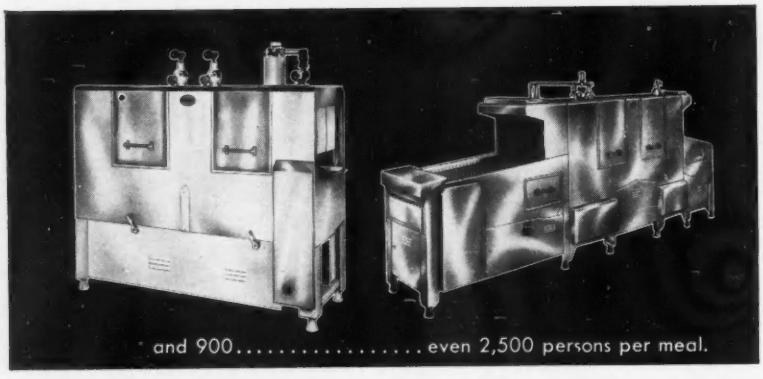

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Vol. 44, March, 1960
*It's in the cards—labor-saving foods.—p. 29.

Storage of Food. Fourth in a series of articles on inventory and storage, this portion deals with storeroom control. The duties of the receiving clerk are brought out, proper working facilities and tools are listed, and equipment and receiving forms for purchasing records are described.

Labor-Saving Foods. A fourteen-page section is devoted to information, recipes, and pointers on the use of pre-prepared foods. Included are prepared baking mixes, soup bases, canned condensed soups, cut-sized frozen fish portions, "boil-in-the-bag" entrées, all-purpose white sauce base, instant potatoes, frozen potato products, turkey rolls, chicken fillets, pre-fabricated meats, and instant puddings and pies.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 28, March, 1960
*An easy kitchen to work in. E. Nicholson.—p. 37.
*The 14 principles of management. T. R. Masterson.—p. 42.

Residence Hall Dining. Food service in a residence hall at Ball State Teachers College, Muncie, Indiana, is featured in this article. The new building has four wings with a dining room for each wing. The kitchen is located in the center. The meal pattern, layout, refrigeration, and equipment are described, and a floor plan is included, as are photographs.

Principles of Management. Principles of management are considered under two headings—planning and organizing. Under the first, come analysis and synthesis, objectives, planning, standardization, and communications. Points developed under organizing include authority and responsibility, fixed responsibility, functions, definite channels, dynamic organizing, simplicity, coordination, human relations, and work simplification.

FAST FOOD MAGAZINE

Vol. 59, February, 1960
*Do you use more portioned seafood?—p. 43.
*Scallops.—p. 48.

Portioned Seafood Popular. The Bureau of Commercial Fisheries has made a survey which indicates that use of portion-controlled seafood by public and institutional eating places is increasing. Reasons for this include convenience and ease of preparation. Breaded portions were the most popular items, and frying was the most popular method of preparation. Buying characteristics of some of the major cities are presented in chart form.

Scallops. Scallops have the advantage of being a quickly prepared food. Recipes and flavor notes are also presented.

FOOD ENGINEERING

Vol. 32, February, 1960
*Technology improves trout. C. R. Havighorst.—p. 82.

The Roche Review Of Enrichment Requirements

for Cereal Grain Foods in the United States

All figures represent milligrams per pound

PRODUCT	Thiamine (B_1)		Riboflavin (B_2)		Niacin		Iron	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Enriched BREAD or other *baked* products	1.1	1.8	0.7	1.6	10.0	15.0	8.0	12.5
Enriched FLOUR[1]	2.0	2.5	1.2	1.5	16.0	20.0	13.0	16.5
Enriched FARINA	2.0	2.5	1.2	1.5	16.0	20.0	13.0	*
Enriched MACARONI & NOODLE Products[2]	4.0	5.0	1.7	2.2	27.0	34.0	13.0	16.5
Enriched CORN MEALS	2.0	3.0	1.2	1.8	16.0	24.0	13.0	26.0
Enriched CORN GRITS[3]	2.0	3.0	1.2	1.8	16.0	24.0	13.0	26.0
Enriched Milled WHITE RICE[4]	2.0	4.0	1.2**	2.4**	16.0	32.0	13.0	26.0

* No maximum level established.

** The requirement for vitamin B_2 is optional pending further study and public hearings because of certain technical difficulties encountered in the application of this vitamin.

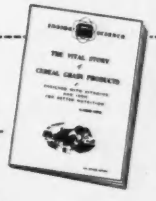
1 In enriched self-rising flour, calcium is also required between limits of 500-1500 mg. per pound.

2 Levels allow for 30-50% losses in kitchen procedure.

3 Levels must not fall below 85% of minimum figures after a specific test described in the Federal Standards of Identity.

4 The Standards state that the rice, after a rinsing test, must contain at least 85% of the minimum vitamin levels. The Governments of Puerto Rico and the Philippines also require this rinsing test. If the method of enrichment does not permit this rinsing requirement to be met, consumer size packages must bear the statement, "Do not rinse before or drain after cooking." Rice enriched by the Roche method will meet the rinsing test. The South Carolina law does not require a rinsing test on packages less than 50 pounds, as the rice in small packages is presumed to be sufficiently clean.

The maximum and minimum levels shown above for enriched bread, enriched flour, enriched farina, enriched macaroni, spaghetti and noodle products, enriched corn meal and corn grits and enriched rice are in accordance with Federal Standards of Identity or State laws. Act No. 183 of the Government of Puerto Rico requires the use of enriched flour for all products made wholly or in part of flour, including crackers, etc.



Brief, authoritative stories about the enrichment of many cereal grains have been gathered into a booklet which you may have for the asking. Just send your request for "The Vital Story of Cereal Grain Products" to the Department of Education, Fine Chemicals Division, Hoffmann-La Roche Inc., Nutley 10, N. J.

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*"Waves" keep frozen milk fresh. W. G. Wearmouth.—p. 85.
*Free China's big protein project. H. C. Chien. —p. 92.

Processing Trout. The Snake River Canyon in Idaho is an ideal place for raising trout. Here, one company processes over a million fish each year. The processing operation is described. Consumer preference dictates that fins, head, and tail remain on the trout. Portion-packed, the fish are treated with chlortetracycline to boost retention of freshness. Dressed and boned trout for institutional markets are dipped in a solution for glazing and added flavor protection; then they are individually wrapped in shrinkable sheet Cry-O-Vac. Brand tags are clipped to gill covers to assure consumer identification of the Idaho rainbow trout.

Frozen Milk Process. As the result of a recent British discovery, freshly pasteurized whole milk can be subjected to a special ultrasonic treatment before being quick frozen; the resulting product can be stored indefinitely without deterioration. When it is thawed, it is indistinguishable from fresh milk. The process, called "Frozonic," is based on research carried out at the National Institute for Research in Dairying, Shinfield, Reading, England. The process is described. Cost of this milk depends on the shipping distance and corresponding transport charges. In some areas of the Middle East, the price to consumers is only slightly higher than that of tinned evaporated milk and the quality is far superior.

Free China's Protein Project. In Formosa, as in many areas of the world, production of animal and vegetable proteins is low. In 1955, Taiwan biochemists and engineers decided that a yeast factory could fill a considerable part of the island's protein requirements. The advantages are as follows: (a) Per acre, floor vs. land, yeast grown in factories can produce one thousand times more food for protein than any cultivated farm crop. (b) Yeast production is faster. (c) The yeast is remarkably efficient in producing edible protein (nearly 90 per cent of the inorganic nitrogen fed yeast during growth is converted into edible protein). Also, the island's cane-sugar by-product, blackstrap molasses, which often sells at distress prices, can be utilized. The entire operation is described. The 40 tons of yeast which is produced daily are being used chiefly as feed for hogs, cattle, and poultry. Efforts are being made to develop new food uses for the yeast. Consumption has been promoted with school children.

FOOD SERVICE MAGAZINE

Vol. 22, February, 1960

New ideas boost lenten sales. J. Rock.—p. 39.
*Extend floor life with proper care. R. Almy. —p. 59.

Floor Maintenance. Resilient flooring, whether sheet types, such as lino-

PROTEIN

essential for an adequate food supply

With other nutrients, the availability of protein determines the adequacy of a nation's food supply . . . with which the United States is well-blessed.

In 1957, this nation's food supplied per person per day . . .

3,180 calories provided by 96 gm. of protein . . .
145 gm. of fat . . . and 382 gm. of carbohydrate . . . accompanied by
1.03 gm. calcium . . . 16.5 mg. iron . . .
7,400 I.U. vitamin A value . . .
1.84 mg. thiamine . . . 2.35 mg. riboflavin . . .
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106 mg. vitamin C.

Of the 96 gm. of protein per person per day . . . ⅔ was supplied by foods of animal origin and ⅓ by foods of plant origin . . . ⅓ by meat, poultry and fish . . . ¼ by milk and dairy foods . . . 1/5 by flour and cereal products . . . 1/7 by vegetables and fruits . . . and 1/14 by eggs. This food supply provides generous amounts of essential amino acids.

Protein malnutrition is rarely seen in the United States where only 1% of the households have less than 50 gm. of protein per day per adult man . . . 72% have more than 100 gm. per day . . . and even 50% of families with incomes of less than $2,000 have more than 100 gm. protein per day per adult man . . . for whom the recommended dietary allowance is 70 gm. Those whose protein intakes least often meet their recommended allowances are . . . adolescent girls . . . homemakers . . . and elderly people.

Diets which supply the pregnant woman with less than 50 gm. of protein and 1500 calories were found, in one study, correlated with maternal and fetal complications.

Milk is man's first dietary source of protein. Milk and dairy foods provide one-fourth of the protein in our food supply.

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

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HOSPITAL ADMINISTRATION

Vol. 5, Winter, 1960

*The social context of motivation. R. C. Stone. —p. 33.

*Problem-oriented administration. W. G. Bennis.—p. 49.

Social Context of Motivation. Five principles of motivation are illustrated and applied to the major aspects of hospital organization. They are: (a) Motives are always multiple and mixed. (b) Institutional purpose effects motives in terms of hierarchy. (c) Institutional patterns make motives appropriate and inappropriate in terms of time and place. (d) Personal and institutional purpose become more closely identified as one rises in the managerial hierarchy. (e) The training and indoctrination of personnel are the chief mechanisms for channeling motives but not for changing them. The three major aspects of hospital organization are caring for the sick, the principle of professionalism, and the hospital's bureaucratic character. The approach outlined should lead to an attitude of inquiry and investigation on the part of administrators.

Problem - Oriented Administration. Here again, the setting is the hospital. The goals of organization are discussed and specific problems are posed relating to motivation and rewards, leadership, and communication.

HOSPITALS

Vol. 34, February 1, 1960

*Two types of tray service studied side by side. Part I. J. D. Thompson, J. Hartman and R. J. Pelletier.—p. 82.

Vol. 34, February 16, 1960

*Two types of tray service studied side by side. Part II. J. D. Thompson, J. Hartman and R. J. Pelletier.—p. 82.

Vol. 34, March 1, 1960

*Good hot food is not enough. Part I. E. E. Halleck.—p. 66.

Hospital Tray Service. Again and again, the merits of centralized vs. decentralized tray service are discussed by hospital personnel. The many variables among hospitals (accounting practices, personnel policies, physical layouts, patient population, quality of food, quality and quantity of dietary supervision) make it difficult to compare the two types of service. However, a study was possible at Stamford (Connecticut) Hospital in which both systems were operating simultaneously. In this 308-bed hospital, centralized tray service was used for four of the eleven in-patient units. Two of them were similar in physical layout, clinical service allocation, and distance from the main kitchen to two units on decentralized service. Food for both systems was prepared in the same kitchen; it was only at the point of service that differentiation in the handling of the food occurred. Comparisons were made to determine: (a) patient acceptance, (b) temperature of food as it is presented to the patient, and (c) direct personnel time and labor costs per patient meal served. The first two points are considered in the first article of this two-part series. Patient satisfaction was measured by interviews. No difference was found in attitudes of those served regular diets, whether service was centralized or decentralized. However, patients on modified diets did express a difference: those on centralized service were more satisfied. Adequacy of portion was the same with both systems, and surprisingly few individuals complained about the temperature of the food. Since so few patients reported dissatisfaction with the temperature of food served, a more accurate measurement of temperature was deemed necessary. A battery-operated electric thermometer, registering in 3 seconds, was used. The two chief items tested were coffee and tea. It was found that there was no difference in food temperature according to the type of food service.

Hospital Tray Service. This continuation of the above article deals with the direct labor hours and wages required to serve trays by the two

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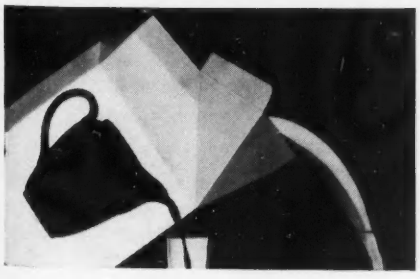

The only milk package with a built-in pouring spout...pours like a pitcher.

Visit your nearby Pure-Pak-equipped dairy. Watch the amazing Pure-Pak machine automatically form the carton from the paper blank, sterilize it both inside and out, and moments later fill it with milk and seal it. Can there be any doubt that Pure-Pak is the most sanitary of all containers? Consider, too, another obvious sanitary advantage: the carton is used only once, only for dairy products, only by you!

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If your cafeteria, restaurant, school or hospital has not yet joined the legions of Pure-Pak users, do so now. Ask your dairy supplier to start Pure-Pak delivery.

Pure-Pak
YOUR PERSONAL MILK CONTAINER

28 million times a day, in 26 countries, someone breaks the seal on a fresh Pure-Pak carton

methods of service. A number of charts help to illustrate that both direct dietary labor hours and costs involved in patient service are less in centralized tray service than in the decentralized system. Though there was no objective evidence, it was felt that much of the time saved in centralized service was in the tray assembly and cleaning sub-functions. The validity of over-all minutes-per-meal as an index for comparing labor hours among hospitals is questioned.

Good Food Service. Patient satisfaction involves more than serving good hot food. At Greenwich (Connecticut) Hospital, the Department of Dietetics achieves its goal by implementing an eight-point program: (a) use of cycle menus, (b) team planning, (c) constant supervision, (d) service of attractive food, (e) orientation of new employees, (f) service of cold foods—as important as serving hot foods hot, (g) provision of the "little things that count," and (h) nutrition education program for patients and student nurses.

INPLANT FOOD MANAGEMENT

Vol. 7, February, 1960

*Future food service U.S. Navy style. J. A. Hart, Jr.—p. 34.

*Columbia University speeds 'em up and wins 'em back. J. P. Nye and A. M. Tracy.—p. 38.

Navy Food Service. With a look to the future in shore base feeding, the Navy expects to tackle the problem of more appetizing food, attractively served. The solution lies in a redesign of the food preparation and serving areas, an "Auto Mess," which is a combination cafeteria and automat. It will support the large scale preparation of individual servings, utilizing mechanical equipment in lieu of manpower. Such an installation is described, and a floor plan is included. This plan for a 4000-man galley will permit feeding three times as fast as a General Mess with four steam lines and four serving stations. In addition to savings in cost, the Auto Mess will provide attractive surroundings, food served with eye-appeal (on disposable plates), and the food preparation area will not be seen by the men. It will be a definite asset in raising morale.

Columbia University Food Service. The educational institution in a metropolitan area is faced with the continuous problem of keeping the patronage of students at its own food service facilities. Overcrowding, slow service, regimented serving lines, and other undesirable factors cause students to go elsewhere. Columbia University has overcome such a situation by changing the cafeteria layout from straight-line to a free-flow type of service. Efficiency was increased further by the use of three hot food stations, a large grill, three cashier stations, two salad and dessert stations, and three beverage stations. Other improvements included adequate lighting, a sound-deadening ceiling, and a colorful decor. All phases of the change are illustrated and described.

INSTITUTIONS

Vol. 46, March, 1960

*Maintenance in the kitchen.—p. 7.

*Steps for proper floor care.—p. 8.

A short course in tools for modern maintenance.—p. 10.

*Management's role in sanitation. V. L. Harris.—p. 38.

*Food service out front. J. Laschober.—p. 50.

*Sanitation for food service workers. T. M. Richardson.—p. 60.

*"The burden being shared out." Part XII. Managing yourself. H. S. Dorsey.—p. 76.

*Sanitation design: a new "stage" of architecture.—p. 83.

*The elements of supervision.—p. 178.

Maintenance in the Kitchen. A number of authorities in the food service field are quoted or were used as resource people in the preparation of this article. Since cleaning of equipment and maintenance of equipment are inseparable, all new equipment should have sanitation engineered into it. Thus, ease of sanitation begins with the manufacturer's choice of material, and facts relating to material and construction are pointed up. Installation (in relation to ease of cleaning) and servicing of equipment are important, too. Since the objective of a maintenance program is to prevent equipment breakdown, employee training and maintenance schedules are vital. Finally, there should be a

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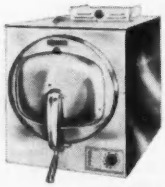
Cook meats, poultry, vegetables and seafoods in half the time and half the space — no hard work of lifting and scouring heavy pots and pans or wasted time watching them boil. There are three basic types of Market Forge steam cookers with a model to fit *your* kitchen whether you serve 50 or 1000 meals per hour.



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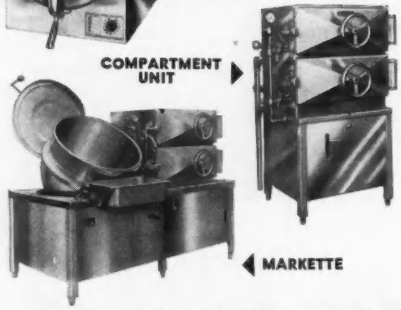
Gives the small operator high pressure cooking for 35 lbs. of food with "Set-it and Forget-it" operation.



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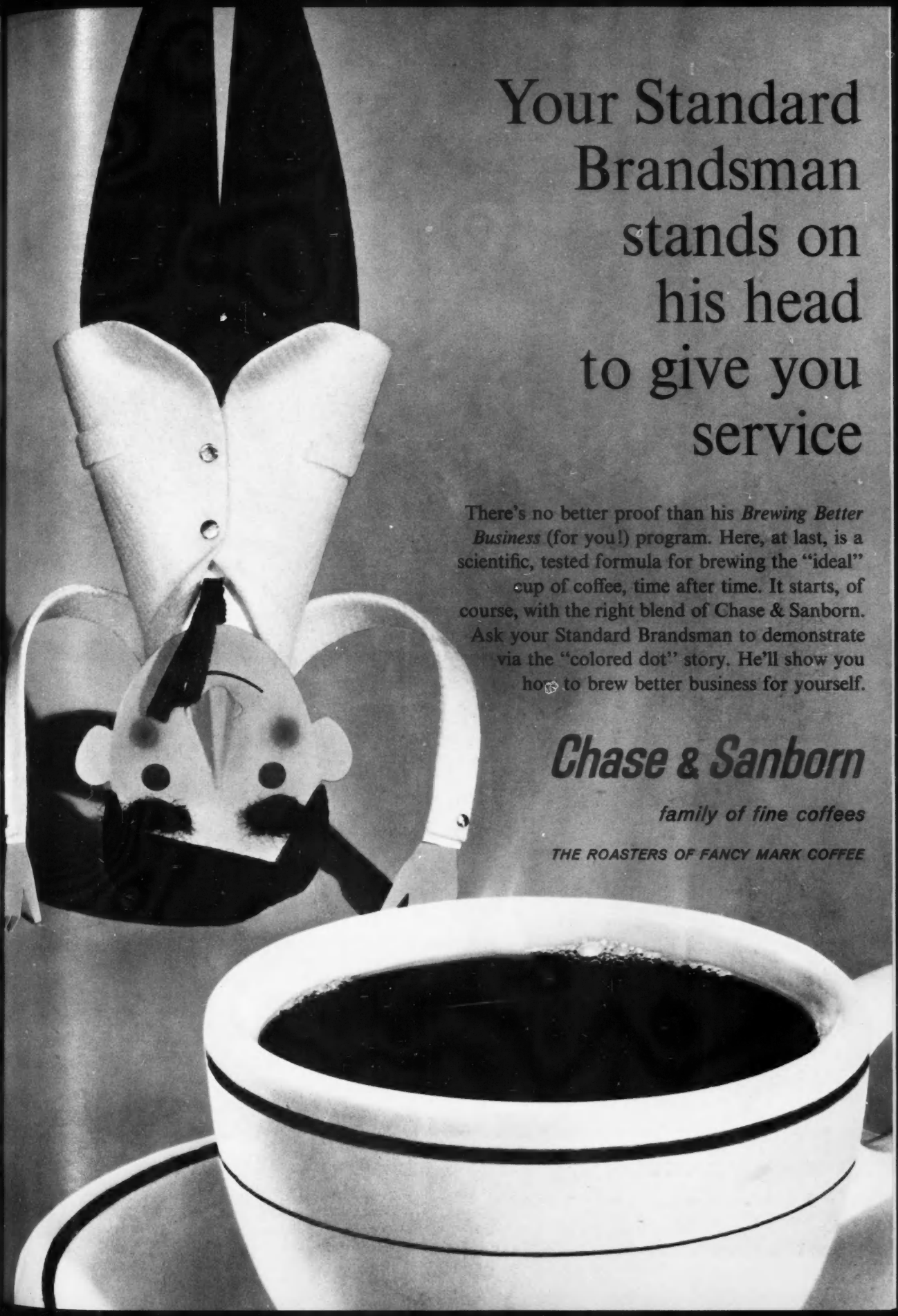
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regular schedule of equipment cleaning. This includes such points as using good detergents; providing adequate brushes, mops, and cleaning cloths; a time schedule for cleaning everything; developing cleaning procedures; training the employees; and routine follow-up inspections. All these factors can be summed up as the esthetics of maintenance.

Proper Floor Care. Experts report that floors get at least 90 per cent more wear than any other part of a building. It's just good common sense to care for this investment with the most up-to-date products and methods. A chart accompanying the article provides quick reference to materials which can be used on various floor surfaces. Types of products to be aware of include: synthetic detergents which serve equally well in hard or soft water and are stable to acids; solvent waxes that clean and wax in one operation; wax and waxless water-emulsion finishes; emulsified resins; sealers of synthetic resins; and cleaning and polishing pads designed to give longer wear and greater efficiency. Basic procedures are given for using a polymer-type water-emulsion finish and a regular water-emulsion finish (wax or waxless). Considerable attention is devoted to wood floors: badly worn or oiled floors, floors requiring sealing, gym floors, and waxing methods. Maintenance of cork; terrazzo, marble, and ceramic tile; and concrete and magnesite floors is also described.

Management's Role in Sanitation. The first section of this article deals with the five areas of management (planning, organizing, coordinating, motivating, and controlling) and how they relate to the achievement of good food service sanitation. The second section suggests how a quality sanitation program can be developed within an institution. Educating supervisory personnel for this job includes acquaintance with basic principles of organic and inorganic chemistry of cleaning, writing clear-cut cleaning compound specifications, and conducting a sanitation survey. Following this type of preparation, a program can be developed (such a program is outlined).

Counters, Stools, Tables, and Chairs. This article, second in a series, deals with seating arrangements for a commercial, competitive type of food service operation. Height and size of counters, tables, stools, and chairs are discussed in relation to the type of service. Diagrams illustrate the correct proportions for various set-ups of counters and stools, as well as table tops and appropriate bases. Points of construction, seating arrangements, and table spacing are also considered.

Sanitation Problems. This question-and-answer column on sanitation deals with two problems: (a) How should sanitized silver be handled to prevent contamination during sorting? Suggested procedures include immaculate hands, perfectly clean towels on which to deposit the silver, and wearing white or rubber gloves for sorting. (b) Why are so many food poisoning cases reported if food service personnel are being trained in sanitation? First, there are still many segments of the food industry where only scant training is being given. Second, without a consistent follow-up, many "trained" employees tend to slip back into careless ways. Public pressure is not yet strong enough to demand instruction of proper quality and subject matter. The attitude so often is, "it can't happen here."

Managing Yourself. Here is the conclusion to a series of articles on good management. The essentiality of the proper mental attitude required of a successful manager is stressed. A deterrent to such an attitude is the mental trick of harboring in our memories things we should forget—our own past failures, other people's unkindnesses, and "what might have been." It is at this point that faith makes an immense contribution to our lives.

The Architect and Sanitation Design. More and more, the spotlight of cost control is being focused on the housekeeping and maintenance functions of a building; sanitation design reveals the important role of the architect in reduction of work load by the reduction of soil load. Factors to

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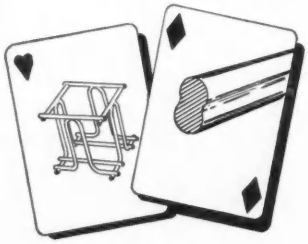

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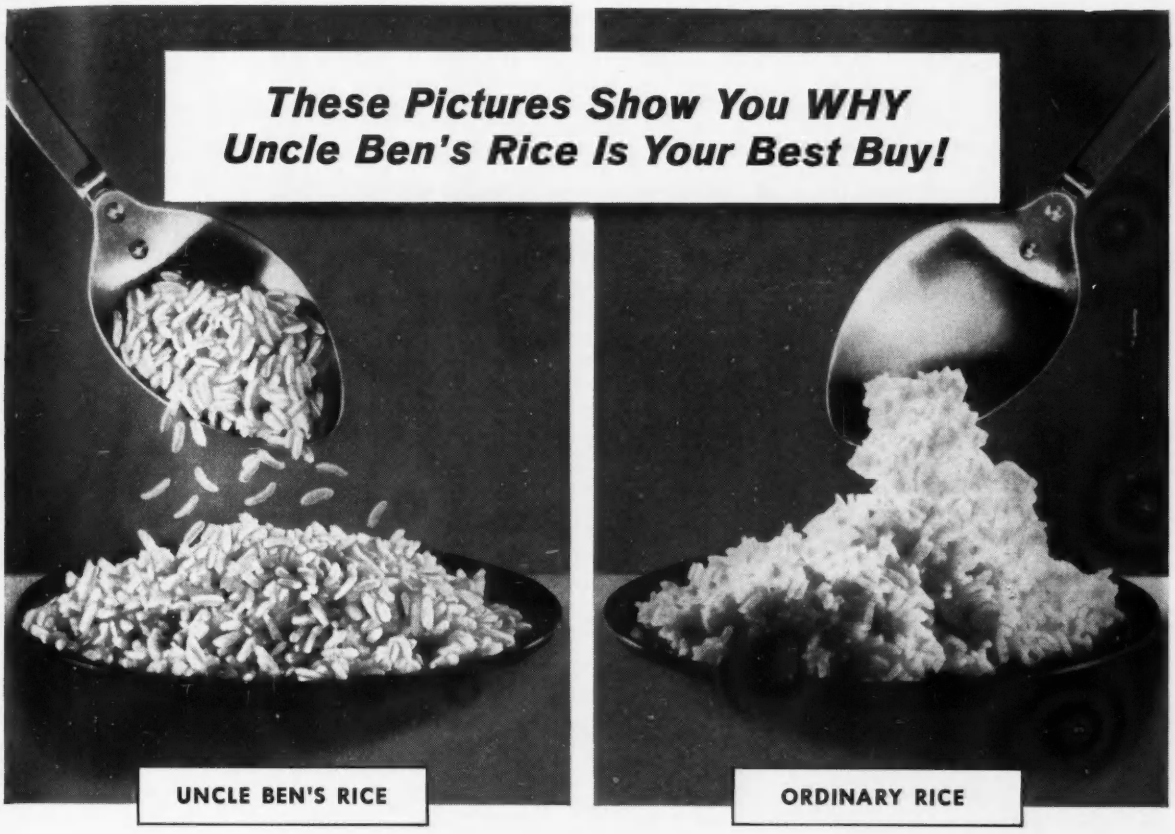

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be considered are cited. Floors require more cleaning time than all other surfaces. Therefore, features which reduce both cleaning time and frequency should be incorporated in the building's design, i.e., ceiling-hung partitions; wall-mounted fixtures, such as water fountains, and coat racks; and suitable floor covering. Characteristics to look for in walls, lavatories, sanitor closets (a trained janitor is called a "sanitor"), lighting fixtures, windows, and furniture are also discussed.

Elements of Supervision. In the past, supervision was viewed as an overlay of authority—a one-way act of overseeing or superintending. The other extreme has been found, too, in the "buddy" who can't help but lose control and effectiveness. Supervision today embodies the best of both systems and has two fundamental parts: (a) understanding and recognition of the results desired, in terms of technical and specialty know-how, in terms of behavior of subordinates, and in terms of management; and (b) insight into the type of action needed to achieve the result. Insight or "feeling" involves both sympathy and empathy. Supervisory action based on adequate insight places one in a better position to decide what action to take. The line supervisor applying these principles has won half the battle. He must realize, however, that supervision is not a cure-all; it cannot cope with situations that have their origins at higher levels.

ARCHITECT: DAN A. CARMICHAEL

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THE MODERN HOSPITAL

Vol. 94, February, 1960

*What part of the payroll goes for absences? M. W. Northrop and C. H. Sparling.—p. 116.

*Let's be sure we get what we paid for. G. W. Peffers.—p. 124.

Payroll Analysis. An analysis was made of the monthly payroll reports by King County Hospital System, Seattle, in 1958, in order to determine what percentages of the payroll dollar were spent for time actually worked, for earned holidays, vacations, and sick time. In summary, the study indicated that: (a) All employees received the same percentage of their pay for paid holidays, and they were all generally taking their holidays close to the dates on which they fell. (b) Much more vacation time was taken the second half of the year than the first. (c) The professional and unskilled groups showed more paid sick time the first half of the year, while the skilled group showed more the last six months. Details of the study are given, as they related to the professional, the skilled, and the unskilled categories of personnel.

Food Receiving. In many cases, receiving is the most neglected function in food operations. Instances of discrepancies are cited. Then, six essentials of an effective food receiving operation are presented: adequate equipment and space, written receiving guides, prescribed standard receiving procedures, qualified personnel, adequate routine control, and independent inspection control.

NRA NEWS

Vol. 3, February, 1960

*Basic principles of food preparation. Part II. Egg cookery (cont.) J. A. Cline.—p. 11.

Egg Cookery. When egg is the main ingredient of a dish, the basic principle of egg cookery should be followed—low to moderate cooking temperatures. Directions for and principles of omelet cookery are given, including French, fluffy, and cream-sauce omelets. Soufflés and whips are listed, too, as products in which egg white serves as leavening. Eggs should be at room temperature before beating; since both sugar and salt help to stabilize the foam, it is well to add part of these ingredients before beating. The use of egg yolks and whites as thickening agents, as custards, is also considered.

PERSONNEL JOURNAL

Vol. 38, February, 1960

*Tell your people first. R. T. Taylor.—p. 326.

Vol. 10, March, 1960

*Opinion survey motivates safety. R. C. Browning.—p. 370.

*This way to self-improvement. S. J. Levy.—p. 373.

Communications. The challenge to purposeful management in the field of

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communications is to define its public and to know how to reach it meaningfully. Cases are cited to illustrate that employees are an organization's most important public. In reaching them, a number of communication vehicles are available. Two are examined—house magazines and corporate citizenship.

Human Motivation and Safety. Opinion polling was the method used to motivate workers, supervisors, and managers to conform voluntarily to safety standards and procedures. Devices used were a questionnaire, individual interviews, and observance of panel discussions. As a result, two reports were made after the data were analyzed: (a) a report to the management and (b) a report to the employees. The employee pamphlet-report provided an opportunity for excellent management–employee relations and noticeably stimulated safety consciousness. It is hoped that others will be interested in exploring further uses of opinion polls in assessing the various segments of personnel management systems.

Self-Improvement. Four areas—skills, knowledge, human relations, and insight—are involved in self-improvement. Skills and knowledge involve one's reasoning capacities (ego); there is a good chance of success in these areas of self-improvement. Human relations and insight are related to one's values and ideals (superego). Results in these areas are more difficult to achieve. The author, in personality testing for business personnel, has noted some of the problems that come up repeatedly with people in relation to their work. One of these involves ambition; when our ambitions are ill-defined, we tend to fool ourselves about how much responsibility we want. It is important to understand our own values. To continue, the most fruitful source of self-understanding comes from examining interpersonal relationships. Numerous questions are posed to help one answer questions in each of these areas of self-improvement.

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PROFESSIONAL NURSING HOME

Vol. 2, February, 1960

•Poultry buying specifications for institutions. —p. 24.

Vol. 2, March, 1960

•Senate subcommittee on problems of aging reports on nursing homes.—p. 5.

Problems of Aging. This article is a condensation of the chapter on nursing homes contained in the Senate subcommittee report, "The Aged and Aging in the U.S.: A National Problem." Statistics show how the proportion of the population over sixty-five confined to nursing homes and homes for the aged has increased and will continue to grow. A discouraging picture is painted in relation to existing facilities, quality of patient care, and cost of care. The subcommittee feels that supervision of nursing homes is primarily a state and local responsibility. It proposes that the Department of Health, Education, and Welfare develop suggested minimum standards for patient care in nursing homes designed to restore and maintain to a maximum degree the physical and mental independence of patients. It also recommends that Congress consider adoption of a program of financial assistance to nursing homes which meet these minimum standards.

Buying Poultry. The federal classes, standards, and grades for poultry provide a basis for buying specifications. According to the Department of Agriculture, specifications should include the following information: kind, type, class, size, style, and grades. Kind refers to the species, such as chickens, turkeys, and so on. Type indicates whether the poultry is fresh, chilled, or frozen. Class tells the physical characteristics due to age and sex, usually on the basis of cooking method (broiling, frying, roasting). Size or weight specifications vary with the method of serving. Style refers to the way the poultry is processed. Grade means the quality of the product; specifications should require that the poultry bear the official grade and inspection legend of the Department of Agriculture, or an acceptance stamp. Hints on buying and using poultry accompany the main article.

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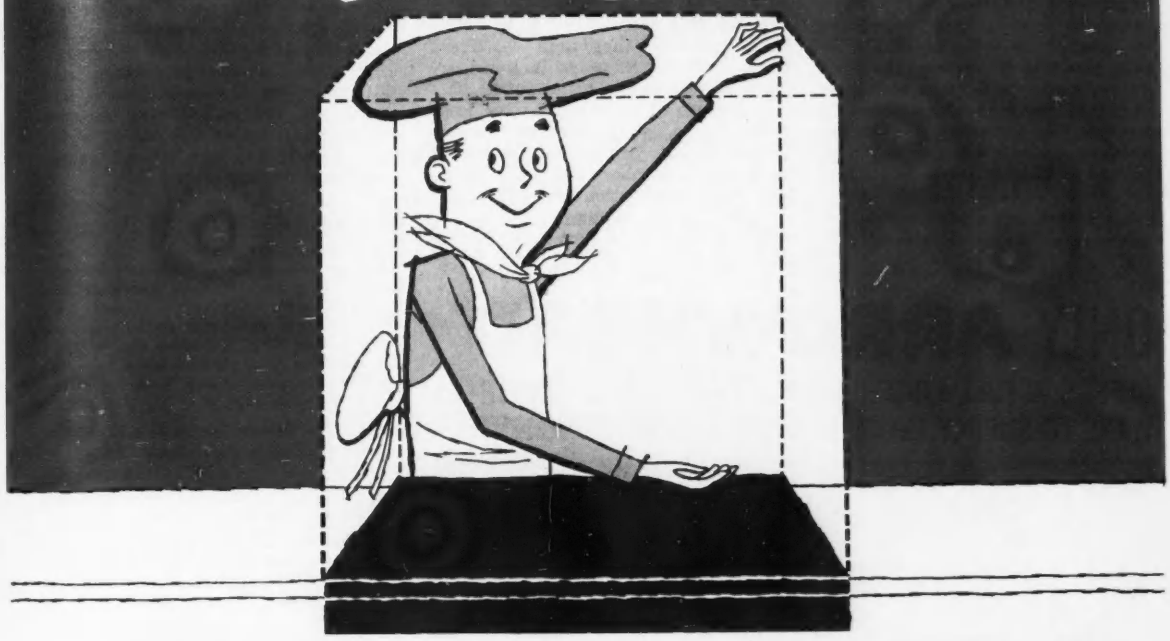

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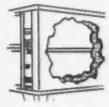

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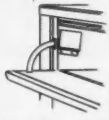

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RESTAURANT MANAGEMENT

Vol. 86, March, 1960

*Vegetables: the neglected food. A. Eiss and G. Eiss.—p. 96.

*Citrus idea center.—p. 103.

*How to save money on depreciation. P. Lockwood.—p. 134.

Neglected Vegetables. New methods of shipping and storing vegetables have resulted in the availability of quality products throughout the year. Even so, many restaurant managers have failed to give preparation of vegetables the attention it deserves. Methods are described for the handling and cooking of green vegetables, sweet corn, cabbage, onions, sauerkraut, potatoes, and frozen vegetables. Stress is placed on quick cooking, good combinations of vegetables, spices and flavoring, and preparation time.

Citrus Fruits. Contained here is a valuable buying guide for citrus fruits. Source, marketing time for the various varieties, and quality are discussed for oranges, grapefruit, lemons, tangerines, limes, and tangelos. The second part of this section on citrus fruits lists products other than the fresh fruit packed in cartons. Included are fresh chilled sections and juices, frozen grapefruit sections, frozen juice concentrates, canned juices, canned fruit, bottled juices, and powdered products. A number of delicious menu and recipe suggestions are listed.

Depreciation Allowances. Income tax dollars can be saved by careful application of the depreciation allowances. The double declining balance method of depreciation is outlined. Instructions come under these headings: (a) determine the new equipment's useful life; (b) reduce to an annual percentage; (c) double this percentage figure; (d) deduct the doubled percentage figure as depreciation; (e) apply the same percentage to remaining balance; (f) change methods later—if your rate of depreciation is less under the double declining balance method than under the old straight-line method; and (g) sell old equipment—don't trade.

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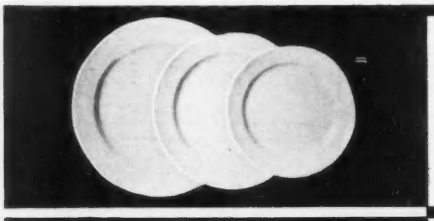

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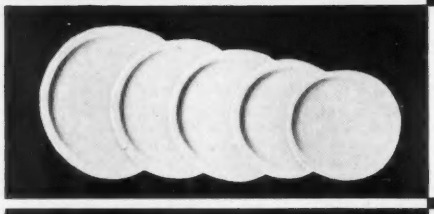

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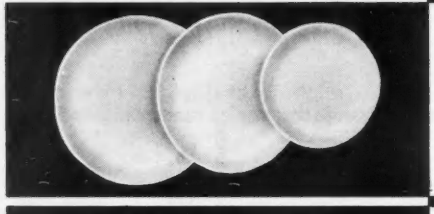

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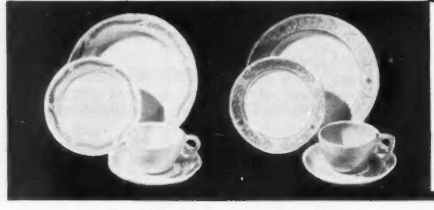

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SCHOOL LUNCH JOURNAL

Vol. 14, March, 1960

*The development of a nutrition education test. E. J. Oyer, L. Wood, and M. B. Patton.—p. 33.

*Work simplification—its applications and principles. G. A. Reinhalter.—p. 40.

*An evaluation of a training school for school lunch personnel in New York. K. Cutlar and A. F. Geis.—p. 49.

Test for School Lunch Workers. The study reported here deals with the development of a test to indicate the lunchroom worker's knowledge and understanding of nutrition. Details of working out the test are given. After revisions, the test consisted of fifty multiple-choice items with five choices for each item; it was administered to 106 lunchroom workers at five testing sessions. Scores revealed that lunchroom workers were least well informed about Type A school lunch requirements and food sources of nutrients. They were better informed on purposes and uses of nutrients, food purchasing, storage, preparation, and general information as called for in the test. There was a positive relationship between test performance and years of formal education. Use of a test such as the one described should result in more adequate training programs and in better selection of lunchroom workers.

Work Simplification. A philosophy of management known as work simplification was developed during the 1930's by the leaders in time-and-motion study. It has been defined as the elimination of uneconomical energy, time, and materials employed in doing a piece of work. The pitfalls of an unsuccessful work simplification program are pointed out—fear and insecurity on the part of those involved in the program. Sound human relations are the answer. Outlines are given on "Principles of Motion Economy as Related to the Use of the Human Body," "Principles of Motion Economy as Related to the Work Place," and a "Work Simplification Formula." Applications are made to school lunch service.

Evaluating a School Lunch Training School. This study was limited to the evaluation of a one-week cooks' training school in New York State. The purpose was to determine if those in the school received the kind of help they needed and how they felt about

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3. Salt and season with chili powder to bring out the hearty flavor of barbecued meats.

4. Try curry powder to make unusual side-order for eggs . . . fish . . . or specialty hamburger garnished with chutney.

the training devices used. In addition, a follow-up survey was made among school administrators to determine the extent to which training had resulted in improvements of their school lunch. The results of the study are reported. The greatest need for more training, as reported by both administrators and cooks and cook-managers, was in the area of food preparation and service. Cooks and cook-managers felt the material on general aspects of the school lunch program and menu planning were, in general, adequate. However, menu planning and the use of federal commodities were among the suggested areas for coverage in future training. Two-fifths of the administrators saw a need for more training in food purchasing and cost control, although all of the cooks and cook-managers considered the material presented adequate. Other aspects of school lunch work which were suggested for coverage in future training programs—even though coverage in the one-week program was not criticized—were sanitation, safety, and personnel relationships and getting along with people. The authors point out other ways to evaluate training.

VOLUME FEEDING MANAGEMENT

Vol. 14, February, 1960

*Potatoes: a profit profile. E. Blair.—p. 13.

*Walk-ins . . . reach-ins . . . and freezers.—p. 21.

*Keep heavy equipment clean. N. M. Hathaway.—p. 26.

Vol. 14, March, 1960

*Geared to serve efficiently and well.—p. 19.

*How to plan a 10-week season.—p. 29.

*New dinnerware, new procedures. W. E. LaBrack.—p. 32.

*Organizing kitchen jobs and titles. P. Dukas.—p. 38.

*Brushes: hard-working sanitation tools.—p. 42.

*The "trayway." Layout and equipment ideas. O. Webber.—p. 69.

*Product evaluation report: self-leveling dispensers.—p. 77.

Profit in Potatoes. Potatoes are gaining new attention; they are versatile and offer time and labor-saving convenience in their new processed forms. A simple starch test for texture is described, storage instructions are given, and the ordinary methods of cooking and baking potatoes are outlined. Different types of processed potatoes are considered, too — frozen French fries, dehydrated potatoes, canned potatoes, and pre-peeled potatoes.

Refrigerators and Freezers. The menu is what determines the kind and quantity of refrigeration needed in food service. The features of walk-in and reach-in refrigerators are pointed out, and the use of freezers is stressed.

Equipment Cleaning Problems. Odor and off-flavor result when equipment, such as coffee urns, meat slicers, and walls and shelving in walk-in refrigerators are cleaned improperly. An effective cleaning program is outlined, emphasizing the need for various chemical cleaners to take care of different soils (organic and inorganic). Employee training is important, too.

Efficient Planning. Food service for an industrial plant in Princeton, New Jersey, was planned to meet three objectives: first, a compact, efficient kitchen using limited personnel; second, a self-bussing system acceptable to the engineer-patrons; third, a design with expansion possibilities. Before plans were drawn up, it was decided that the menu was to be very limited. Only the equipment essential to the menu was used. The dishwashing area and the straight-line kitchen are described. Solution to the soiled dish problem was found in a conveyor, running the length of the dining room and built deep enough so that dishes could not be seen as they moved along.

Summer Camp Food. Here are facts and figures on the operation of a successful summer camp food service. At the three camps in Pennsylvania, 3300 meals daily are served for an eight- to ten-week period. Purchasing policies are stated, and food costs are tabulated. Menus are planned a week in advance and are based on menus used during previous seasons.

Change to Plastic Dinnerware. A hotel reports favorably on the change from china to plastic table service. No change has been necessary in dishwashing procedures and equipment.

Makes eating pleasurable for dieters!

NEW! THE LOW-SODIUM/ FAT-CONTROLLED COOKBOOK

Tells how to prepare tasty meals and apply seasoning for diets low in saturated fats and sodium

Today, the patient on a low-sodium or a fat-controlled diet must face the prospect of eating bland food.

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Included are important tables that list calories, milligrams of sodium and grams of saturated and total fat in most foods.

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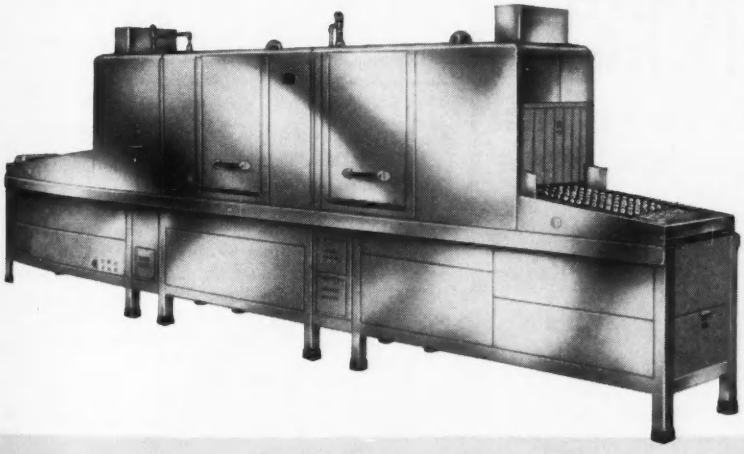
one thing in common...

...their tableware was washed by a Hobart Flight-Type dishwasher...standard for volume operations



Whether in a restaurant, hotel . . . cafeteria in an office building, school or hospital, they do have one thing in common! They eat every day, and agree with you on clean tableware. Hobart dishwashers are the unparalleled answer. "Unequaled speed, thoroughness and efficiency" skims over the Hobart flight-type dishwasher story much too fast. For here is every dishwashing service you need built into one amazingly fast machine (many models)—custom-designed to cut costs in volume food operations. Fully automatic, it delivers the lowest possible operating cost, with traditional Hobart dependability.

If your operation is less than large volume, there's a complete line of more than 50 other Hobart dishwashers—one is exactly right for your needs.

Nationwide Service through over 200 Hobart Service Offices. the largest network of service in the industry.

Hobart Flight-Type Dishwashers

Completely automatic power-water-scrapping, power washing and rinsing, with human supervision reduced to a minimum. Dishes are continuously racked in conveyor between Delrin-tipped, resilient, stainless steel "flight links"—stainless steel specially treated to protect chinaware against markings...side links, rollers and tie rods of stainless steel. Famed Hobart combination jet-powered and revolving wash system insures thorough sanitation. Sizes range from 12 to 26 ft. long, with conveyor speeds from 5 to 12 ft. per minute. Dozens of other exclusive features make it the most advanced dishwasher made.

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The World's Oldest and Largest Manufacturer of Food, Bakery, Kitchen and Dishwashing Machines

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Please send me more information on: ☐ The Hobart flight-type dishwasher, ☐ the complete dishwasher line. ☐ I would like the name of my nearest Hobart dealer.

Institution.....

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City.....Zone....State.....

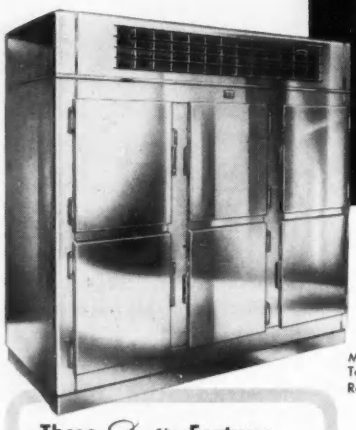
The only regular supplemental cleaning involves the cups. Employee morale has improved—waitresses in particular appreciate the change. In addition, considerable savings have resulted. Another point of interest involves the menu. Though steak is served with serrated steak knives, the scratches occurring on the plates are not serious enough to warrant discarding them before their normal life expectancy is reached.

Kitchen Jobs and Titles. Kitchens in American restaurants are often under-organized, with too few departments, no regular line of promotion, no understudies, too few supervisors, ill-defined duties, and little prestige for many jobs. Also, kitchen organization and job titles change as new equipment is devised, and new products are developed. Titles should be selected that will not restrict the duties performed. For instance, instead of *pot and pan* men, employ *utility* men who may also operate the dish machine and do porter's work. Interchange of skills results in higher efficiency and lower wage cost. Rather complete lists of jobs and job titles are given for both service and kitchen personnel.

Brushes. Brush construction and the qualities of a good brush are considered. The parts of a brush include the block (the material in which the bristles are mounted), the bristles, and the handle. Characteristics of the materials from which blocks and bristles are made are described, in the light of their use in food service. Plastic and plasticized rubber blocks hold up well. In bristles, nylon fibers are taking over the heavy-duty cleaning field. Explanation is given of the three methods of setting bristles in the brush handles.

Equipment Idea — The Trayway. The design, installation, and operation of a central tray assembly station for a large hospital are described. This seven-station unit operates on the conveyor principle, but without an actual moving belt. Many of the technical aspects of the equipment are included.

Self-Leveling Dispensers. The self-leveling dispenser is defined as a device that holds and stores serving equipment and positions it at counter level. It is customarily used at point of service. The heart of the device is a compression-type, calibrated spring mechanism which automatically compensates for the weight, and thereby the height of the load. The two basic types of self-leveling devices are the tube and the chassis. The mechanism is available for both built-in and self-enclosed cabinets, in stainless steel or faced with any plastic surfacing material to match operation decor. Heating is optional. Uncomplicated in design, the dispensers require little maintenance. The products of three equipment companies are described in this article.



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WHAT'S NEW IN HOME ECONOMICS

Vol. 24, March, 1960

*Students learn by doing! M. L. Brooks.—p. 22.

Teaching Food Values. Nutrition education in the schools of Fulton County, Georgia, is a live thing. An evaporated milk project was conducted in the eight county high schools last year. At the beginning of the term, each home economics teacher was sent suggestions as to ways that evaporated milk projects might be worked into the typical teaching situation—preparing party or gift foods at holiday times; a consumer unit in any class, emphasizing foods with high nutritive value at moderate cost; and so on. The varied ways in which classes responded is reported. One interesting project was prepared by an advanced homemaking class in which the girls represented their chosen careers with a specific project built around the use of evaporated milk. Two student telecasters demonstrated the preparation of a frozen fruit salad. A student food specialist tested a recipe for fondant. The equipment specialist demonstrated the use of an electric frypan in making apple pancakes. These and a number of other careers were applied, and many new skills and interests developed as a result.

QUALIFIED DIETITIANS! STUDENT DIETITIANS! COLLEGE JUNIORS!

HERE'S FOOD FOR THOUGHT

Now the Army Medical Specialist Corps offers you superior professional experience in dietetics—while furthering or completing your professional education. Consider these four challenging programs—each one an outstanding educational opportunity:

1. Dietetic Internship Program: This 12-month internship (approved by the American Dietetic Association) is open to qualified college graduates. If accepted, you train as a hospital dietitian while receiving the prestige, pay and allowances of an Army officer.

2. Graduate Dietitian Program: This program offers qualified dietitians an opportunity to complete college studies leading to a master's degree in Foods and Nutrition or Institution Management. If accepted, you receive an officer's pay and allowances while attending the college or university of your choice. Upon receipt of your master's degree, you are assigned to the Food Service Division of an Army hospital.

3. Student Dietitian Program: Junior or senior college students who qualify for this program can complete their studies while earning more than $200 a month. Upon graduation, you continue your education in the Army Dietetic Internship Program.

4. Dietetic Summer Practicum: This 6-week program offers qualified applicants practical experience in hospital dietetics. The program is open to young women who have completed their junior year in college as home economics majors. If accepted, you become a temporary Federal Civil Service "student employee" at a selected Army hospital—receiving a salary of $166 a month.

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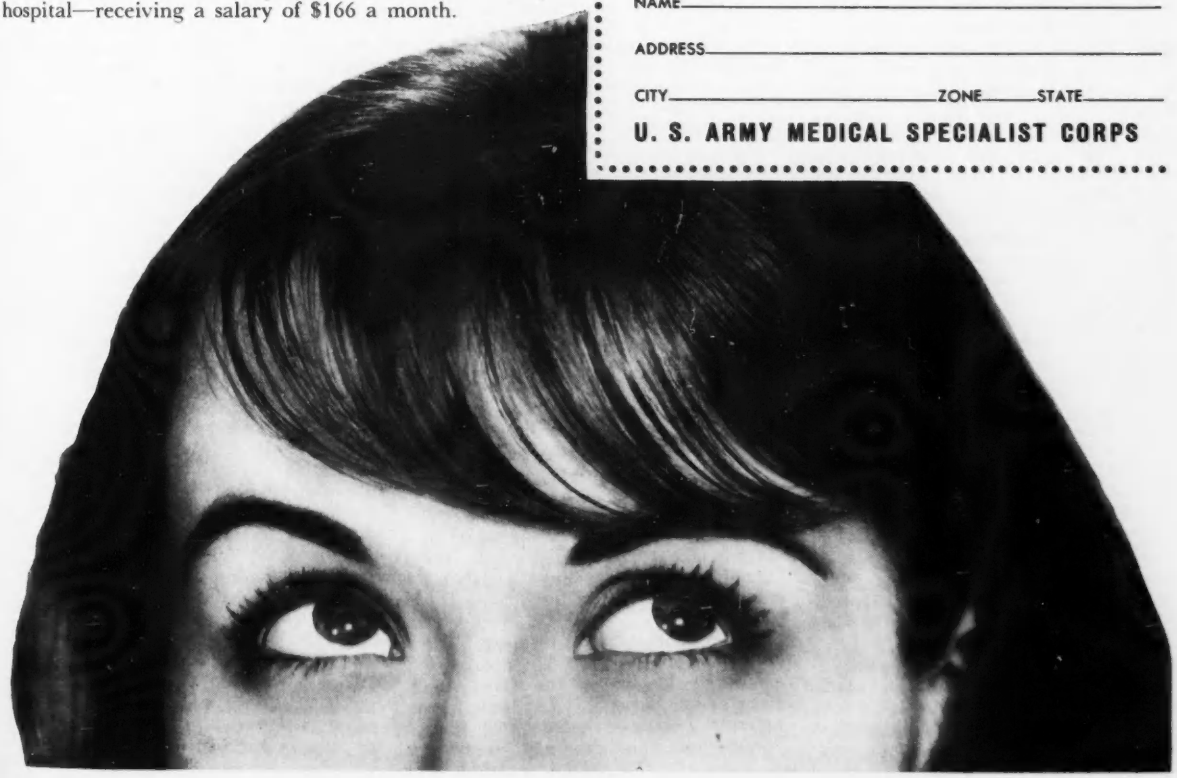


Permissible Radiation Level for Foods Lowered. During March, Arthur S. Flemming, Secretary, Department of Health, Education, and Welfare, announced that permissible limits of radioactivity in food have been cut by 60 per cent to 33 micromicrocuries strontium-90 per liter from 80 micromicrocuries. Some foods have already shown concentrations above the permissible limits, but officials have not been unduly excited about this since so-called ceiling dosages are computed on the basis of lifetime exposures.

The change was made on the basis of a recommendation of an *ad hoc* subcommittee of the National Committee for Radiation Protection that man-made radiation levels (excluding medical and dental sources) be confined "substantially" to the background level of natural radiation. By reducing the "permissible" limit of fallout and atomic waste radiation to the level of background sources, the individual will get a total dose of three times the background, made up of: background, radiation from medical and dental sources, and other sources, such as fallout, wastes, television, watch dials, and so on.

Evaluating Hazards of Food Additives. The newest report to come from the Food Protection Committee of the Food and Nutrition Board is *Problems in the Evaluation of Carcinogenic Hazard from Use of Food Additives.*

Three tentative generalizations have been drawn from the literature: (a) If a substance is carcinogenic for one mammalian species, it probably will be carcinogenic for many, but not necessarily all others. (b) If a substance is carcinogenic by one route of administration, it will probably be so by others. (c) Under specified experimental conditions, there are nontumorigenic levels of exposure to carcinogens. Problems in devising and executing animal tests for carcinogenicity are discussed, and suggested procedures are outlined.

Since it is necessary to rely on the results of stringent animal tests, it is probable that negative findings indicate that minimal hazard would accompany use of a given material in foods. Assignment of tolerance levels in foods of substances shown to be carcinogenic must rest largely on evaluation of alternative risks and values.

The Committee does not discuss individual substances that are, or might be, food additives, nor does it try to assess hazard from such use. Also, it does not imply that there is any present hazard. This report is concerned only with developing general principles and procedures which might be useful in making such evaluations.

Copies of this report may be ordered for $1 each from: Printing and Publishing Office, National Academy of Science—National Research Council, 2101 Constitution Avenue, Washington 25, D.C. It is National Academy of Sciences—National Research Council Publication 749, dated December 1959.

The following foods are on the USDA's list of plentiful foods for May:

Protein foods
Cottage cheese
Scallops
Other foods
Cranberry products
Peaches—canned freestone
Vegetable fats and oils

Frozen Foods for May. From the National Association of Frozen Food Packers come these suggestions for menu items in May:

Frozen Fruits and Juices

CONCENTRATED CITRUS JUICE COMBINATIONS—should always be on the breakfast menu. For health interest, encourage the use of juices for snacks.

BLUEBERRIES—especially striking in combination with other fruits, such as frozen peaches, frozen strawberries, and frozen grapefruit.

PEACHES—serve with ice cream or as peach Melba.

RASPBERRIES—in meringues with whipped topping, raspberries make an easy-to-do, attractive dessert.

FROZEN DESSERTS—a greater variety of frozen pies is being made available, as well as fruit pastries.

Frozen Vegetables

BEANS, GREEN—available in several cuts, whole, cut, and French cut for menu variety. Touch up with slivered almonds or mushrooms.

BEANS, LIMA—a favorite vegetable in any operation.

CUT CORN—delicious buttered; colorful when combined with green pepper and pimiento; may also be combined with green vegetables, such as green beans or Lima beans.

Frozen Prepared Foods

The number of frozen main dishes, dinners, casseroles, and "boil-in-the-bag" foods is increasing almost daily. Many may be used advantageously to amplify menu offerings, but the "stand-bys," such as meat and poultry pies, should not be overlooked.

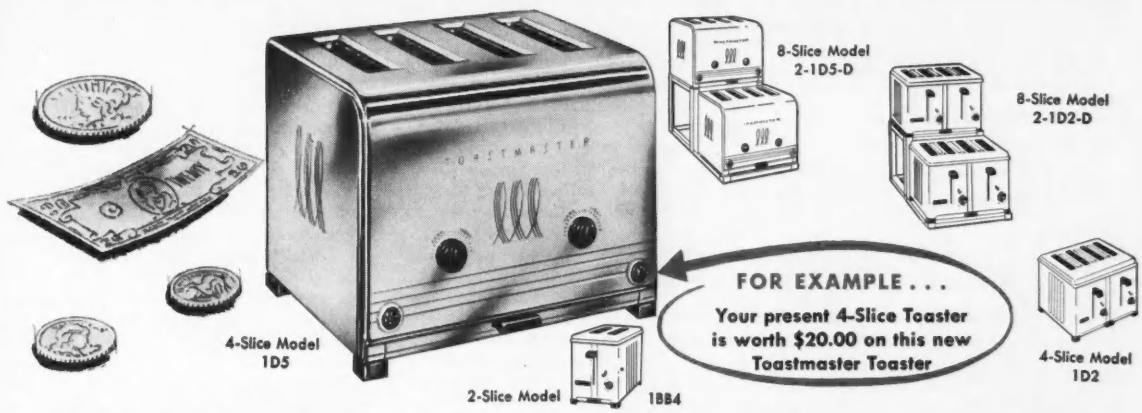
New Booklets of Interest. The JOURNAL office has received a copy of a new booklet from the California Heart Association for distribution to patients, *Polyunsaturated Fatty Acids Menu Plan.* This mimeographed booklet was prepared by a publication committee, which included in its membership two dietitians: Helen Madigan and Maxine Merrick. The booklet features the four-food-group basis of menu planning, and on facing pages presents, according to food group, foods to "use" and foods to "avoid." A basic menu pattern containing 85 gm. protein, 90 gm. fat, 210 gm. carbohydrate, 2000 calories, approximately 12 gm. saturated fatty acids, and 71 gm. unsaturated fatty acids is outlined, and a sample menu, based on this pattern, is also given. Other features of the booklet are the inclusion of almost twenty recipes, as well as lists of common foods high in polyunsaturated and saturated fatty acids. Copies of this booklet may be requested from the California Heart Association, 1428 Bush Street, San Francisco 9.

Another publication worth noting is *Low Cost Cooking for One or Two* by Olaf Hanson, food consultant of Duluth, Minnesota. Mr. Hanson at age seventy-five, in retirement has gathered together many ideas learned during a lifetime's work in the food service industry and applied them to the problems of the aging person living alone or with only one other person. He has kept the bugaboo of cost uppermost in his mind and suggests a monthly food budget of $20 per person. The figure of $20 would seem a little low, we think, although Mr. Hanson's ideas could certainly be put to good use in minimizing food costs. He includes suggestions on food buying, cooking, and storage to achieve maximum economy. This pocket-size book includes discussions of the use of milk, potatoes, vegetables, various cuts of meat, fish, gravies, cookies, and desserts, and a number of other foods. His style of writing is lively, his cooking "tips" are useful, and his approach should encourage the reader to try his suggestions. Single copies may be ordered for $1.10 each from: Labor World, Inc., 34 East Superior Street, Duluth 2.

Household Finance Corporation has revised its booklet on *Money Management—Your Food Dollar* to bring it up to date. The four-food-group plan, as well as Canada's "food-rules," is presented, in addition to ideas for storing and preparing food. Special guides for food buying, divided into two sections—one for processed foods and one for fresh foods—comprise more than half of the forty-page booklet. Copies may be ordered for 15 cents each from: Household Finance Corporation, Prudential Plaza, Chicago 1.

Just released by the National Sanitation Foundation is its Standard Number 5, *Commercial Gas Fired and Electrically Heated Hot Water Generating Equipment (for Food Service Establishments Using Dishwashing Machines).* The title is self-explanatory. The material incorporated in the booklet covers definitions, materials, construction, and installation recom-

SAVE up to $45 on a new Toastmaster toaster


8-Slice Model 2-1D5-D
8-Slice Model 2-1D2-D
FOR EXAMPLE . . .
Your present 4-Slice Toaster is worth $20.00 on this new Toastmaster Toaster
4-Slice Model 1D5
2-Slice Model 1BB4
4-Slice Model 1D2

Trade in your old toaster regardless of make or condition

Your old toaster is worth real cash if you act now! For a limited time your Toastmaster dealer is giving BIG dollar allowances when you trade for a new, modern Toastmaster toaster.

Here is your opportunity to enjoy the advantages of fast, efficient Toastmaster toasters at tremendous savings! Turn "worn equipment headaches" into profits before rundown toasters cost you money—before repair bills mount . . . before production bottlenecks occur . . . before poor quality toast costs you customers: in a nutshell, unload now *at our expense* . . . and do it at a PROFIT!

See the Trade-In Schedules below for specific savings on popular Toastmaster toasters and waffle bakers, too. With bigger profits and real savings to be had, you'll want to act now! Call your Toastmaster dealer while these big dollar trade-in allowances are still available . . . while they are yours for the asking!

Act Now! Offer Good for a Limited Time Only

When you trade-in these old commercial toasters	These allowances apply on the purchase of New Toastmaster Toasters		
	2-Slice Model 1BB4	4-Slice Models 1D2, 1D5	8-Slice Models 2-1D2-D, 2-1D5-D
2 or 3-Slice Toaster	$7.50	$10.00	$15.00
4, 6 or 8-Slice Toaster	—	20.00	35.00
Conveyor Toaster	—	25.00	45.00
Household Pop-up Toaster	5.00 (Limit 1)	5.00 (Limit 2)	5.00 (Limit 2)

BIG WAFFLE BAKER SAVINGS! Your dealer will allow $20 for *any* old single or double unit commercial waffle baker in trade on a new Toastmaster model 2E2!

"Powermatic" Toasters
300 to 1200 slices of perfect golden-brown toast an hour! No levers to press. Reliable electric motors lower the bread and serve it up when toasted. Exclusive Superflex Timer makes each slice uniform in color and flavor!

"Automatic" Toasters
Models from 2 to 16 slices, capacities of up to 1,000 slices per hour! No waiting or watching—when the toast is done . . . up it pops!

"Automatic" Waffle Bakers
"Siltect" coated grids help prevent sticking; "pinpoint" thermostat makes every waffle delicious. Automatic preheating; signal lights!

The Complete Line of Electric Cooking Equipment

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CENTRALIZE
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AERVOID
Vacuum Insulated Carrier-Dispensers

- Greatest Durability
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Eliminate Costly Duplication Of Equipment, Labor And Space By Adopting The "AerVoiD-Central Kitchen System"

Serve Food or Beverages piping Hot or refreshingly Cold to any number of people, at any number of locations, any distance, with Portable "AerVoiDs" — Their permanently efficient VACUUM-INSULATION does not settle, shrink or deteriorate. It provides a positive "Safeguard" against insanitary leakage, because it requires Air-Tight Construction of the Greatest Durability — Specify "AerVoiD" to be Sure!

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mendations. An appendix includes technical information with a number of tables and graphs. Copies of this new Standard Number 5 may be requested from the National Sanitation Foundation, Ann Arbor, Michigan.

Keeping up with the Government. Four new reports from Social Legislation Information Service, Inc. (1346 Connecticut Avenue, N.W., Washington 6, D.C.), give concise information on governmental affairs touching on areas of interest to dietitians and nutritionists.

The first, *Federal Agencies Financing Research* (Document 14, Price $1) is a complete guide to government grants and contracts for 1960. It is designed to guide the investigator directly to the federal bureau or agency which may best utilize his special competences. A detailed index lists the scientific fields and indicates the agencies sponsoring extra-mural research in each field, and on the following pages, the federal offices themselves are listed. Programs, procedures, and organization of each are summarized to indicate generally the design of each research program and the extent of its extra-mural component.

The other three reports, each costing 25 cents, are described by their titles: "Report of Advisory Council on Public Assistance"; "Report of Advisory Council on Child Welfare"; and "Senate Report on Problems of the Aged and Aging."

Nutrition Week in New York City. As this issue is going to press, extensive plans are being formulated to focus attention on Nutrition Week in New York City, May 1 to 7. Mayor Robert F. Wagner has proclaimed May 1 to 7 as New York Nutrition Week. Throughout the five boroughs, programs particularly tailored to neighborhood needs will be presented, following a theme, "It's the Food You Eat That Counts." Times Square will be changed to "Nutrition Week Square," restaurants will call diners' attention to Nutrition Week with menu notes or table cards, and department stores will have window displays. Nutrition education programs for adults will be carried out in schools, parent-teacher groups, hospitals, day centers, settlement houses, homemaking centers, and foster homes for adults.

In Brooklyn, a school poster contest is being planned, with the winning posters to be displayed by a bank. The Sirovich Day Center in the Bronx is planning a series of eight meetings for a nutrition education program for senior citizens. Speakers will include nutrition consultants, doctors, and teachers. A program will be presented in Brooklyn on May 3, featuring Dr. Ethel J. Alpenfels of New York University, who will speak on "Nutrition and Culture—Understanding for a Changing World."

Three A.D.A. members are included on the committee planning Manhattan activity: Dr. Clara Mae Taylor, Teachers College, Columbia University, Chairman; Lorraine Boykin, Nutritionist, Department of Health; and Dorothy Kinnear, Dietitian, Presbyterian Hospital. Martha Kelly, General Foods Corporation, White Plains, is directing the publicity for the week.

Health Care of the Aged. Ray E. Brown, Superintendent, University of Chicago Clinics, has been elected Chairman of the Joint Council to Improve the Health Care of the Aged. The Joint Council was formed in 1958, under the sponsorship of the American Dental, American Hospital, American Medical, and the American Nursing Home Associations. According to Mr. Brown, the "objectives of the Joint Council are to correlate the efforts and resources of member organizations as the principal purveyors of health care for the aged." Some of the areas of work of the Joint Council encompass: (a) identifying and analyzing the health needs of the aged, (b) appraising available health resources for the aged, (c) fostering effective methods of payment for the health care of the aged, (d) developing community programs to foster the best possible health care for the aged, (e) fostering health education programs of the aged, and (f) informing the public of the facts related to the health care of the aged.

Within the last year, affiliates of member organizations in twenty states have established joint councils, and several other states are in the process of organizing such councils.

Spring Meetings. The following national meetings are scheduled for May or June, and may be of interest to readers:

National Hospital Week—nationwide, May 8 to 14.

The Institute of Food Technologists—20th annual meeting, May 15 to 19, San Francisco.

Institute for Hospital Food Supervisors, sponsored by the Catholic Hospital Association—May 30 to June 16, St. Louis.

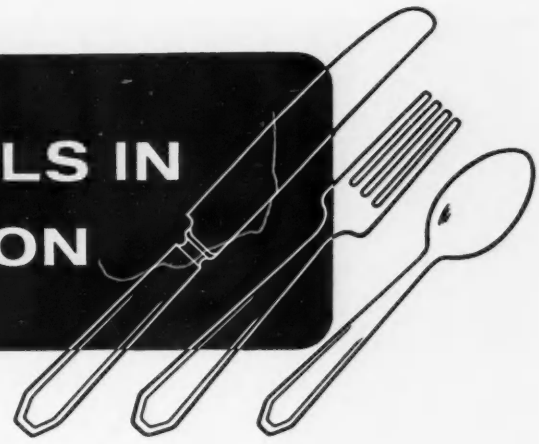
Second Public Health Nutrition Institute — University of Pittsburgh, June 5 to 10. The dates were incorrectly listed as June 13 to 17 in the March issue of the JOURNAL.

Institute on Food Purchasing—Chicago, June 6 to 10, co-sponsored by the American Hospital Association and A.D.A.

Conference of the Women's Bureau—to celebrate its 40th anniversary, June 9 and 10, Washington.

The Canadian Dietetic Association—25th annual meeting, June 14 to 16, Montreal. Speakers will include: Dr. Hans Selye, Dr. Jean Webb, Louise Frolich, Pierre Burton, Dr. Gerald LaSalle, and Dr. Alastair MacLeod.

IMPORTANT TOOLS IN YOUR PROFESSION



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EAT VITAL FOODS · EVERY MEAL · EVERY DAY
a selected variety from each group . . .
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2. MILK and MILK PRODUCTS
3. VEGETABLES and FRUITS
4. MEAT GROUP
. . . plus a regular program of
ACTIVITY · REST · HYGIENE
RECOMMENDED SERVINGS IN THE FOUR FOOD GROUPS
BREADS AND CEREALS
MILK AND MILK PRODUCTS
VEGETABLES AND FRUITS
MEAT GROUP
OTHER FOODS

Tools become symbols of trades and professions. A stethoscope signifies a physician. A drill stands for dentist. A thermometer suggests nursing.

Consider tableware—foods and nutrition. A knife, fork and spoon are tools. In one person's lifetime, they are used to convey tons of food from plate to person—food that is processed in the almost miraculously complicated chemistry of nutrition into living bone, skin, teeth, muscle, nerves and energy. Personal food selection thus can mark the critical difference between degrees of illness or robust good health.

In this sense, a knife, fork and spoon are tools of personal nutrition—good or bad. Let them symbolize the science of nutrition . . . of utmost importance to the physician, dentist, nurse, dietitian, or public health worker . . . to all who counsel a person on what and how much to eat.

Because you serve as an advisor on food in clinical or general practice, may we offer you another "tool"—the "Shield of Good Health," illustrated at left. This chart is a full color visualization of a new Four Group Guide to food selection, devised by the nutritionists of the Department of Agriculture. For your review copies in two sizes, please write or send the coupon.

The nutritional statements made on this chart have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

ENRICHED . . .
and whole wheat flour foods are listed among the "Essential Four" food groups set up by the U. S. Dept. of Agriculture's Institute of Home Economics. Diet selected from these foods provides ample protein, vitamins and minerals.

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Institute on Dietary Administration—San Francisco, June 20 to 24, co-sponsored by the American Hospital Association and A.D.A.

American Physical Therapy Association—37th annual conference, June 26 to July 2, Pittsburgh. Theme: "The Physical Therapist and Industry."

Information on Diabetic Camps. As an undergraduate project, a dietetic major at the University of Minnesota, under the direction of Annette Gormican, Assistant Professor of Home Economics, has made a survey of summer camps for diabetic children in the U.S. and Canada. The results of this survey have been deposited in the A.D.A. Library. The following information on each camp has been compiled: size of camp, age of campers, staff, method of diabetic control which is followed, type of diet served, recreation activities available for campers, financing, and special problems which have been encountered. Members of the Association may borrow this material on request to the A.D.A. Library.

More Research on Radioactivity of Food. The nation's first long-term study of the effects of radioactive fallout on man's food supply is being conducted at the University of Michigan in cooperation with the Argonne Laboratories and seven agricultural experiment stations. The purpose of the study is to draw a "base line" for measuring the slow rise of radiologic levels in grain and other crops. Crop samples grown at one location are examined with radio-chemical techniques in successive years to establish trends.

Professor A. Geoffrey Norman of the Department of Botany reports that, although the level of radiation appears to have increased between 1949 and 1955, only a "fantastically small" amount of radiation has worked its way into the nation's farm crops and that it could stabilize fairly soon if no further nuclear tests are conducted.

The high cost of handling individual 2½-lb. grain samples from each source has kept the research on a limited scale so far. The cost of analyzing this amount of one commodity from one station is estimated at $75, but Professor Norman anticipates that an increasing number of samples and different types of crops will be added to the program in the years ahead.

Food Marketing Study. From 1924 to 1954—thirty years—the food buying habits of the American people have changed considerably, according to a recent USDA marketing study. During those three decades, the consumption of frozen foods increased ninefold. The second largest change was a 275 per cent rise in the civilian use of canned foods, and the proportion of the total civilian supply of

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farm foods processed in some way—as canning, drying, curing, freezing, or baking—went up from 25 to 35 per cent. The proportion handled by marketing agencies increased from 80 to 91 per cent.

In contrast, use of milled grains without further processing into bread, other bakery products, or mixes decreased 40 per cent.

Estimates by the USDA indicate that the per capita quantity of all purchased food may rise as much as 15 per cent in the next fifteen or twenty years, and per capita increase in quantity and money spent for processed foods for home consumption are likely to be half again as much as for unprocessed foods.

Plum Sherbet. Plum sherbet, developed at the Idaho Agriculture Experiment Station, has proved so popular that it may be commercially manufactured in the near future. To find new outlets for the hardy blue Idaho plum, dairy manufacturing specialists and plum growers cooperated in developing several types of plum ice cream and sherbet. Both fresh and cooked plums were used. A two-month taste-testing program, using University students, visitors at the Station, and manufacturers of dairy products, indicated that the product is rated high for both attractive color and flavor. The Idaho Station is now studying the best methods of processing plums for use in sherbet.

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Milk Consumption. In Rhode Island, a survey indicated that 31 per cent of the families had never tried nonfat dry milk. On the other hand, most of those who had used it for some time reported that they had increased their purchases. About half the dry milk was used as a beverage, the other half for making desserts or in baking. Many large families used it mixed with fresh milk. It was most widely used by adults, however, and often for dietary reasons.

About three-fourths of the fresh milk was used for drinking, with families with children using it most.

Evaporated milk was commonly used in coffee and tea, for cooking, and for infant formulas. A few reported that they diluted it and drank it, and some mixed it with fresh or dry milk.

The study was conducted by the Rhode Island Agricultural Experiment Station.

News of State Associations

Alabama Dietetic Association. Tuscaloosa was the scene of the spring meeting of the Alabama Dietetic Association on March 25 and 26. Features of the program were: a communications workshop and a paper on "Diet and Mental Health," by Dr. A. B. Stephens. Edith Jones, Speaker of the A.D.A. House of Delegates, attended the meeting as the national Association's representative.

Colorado Dietetic Association. The spring meeting of the Colorado Dietetic Association was held April 22 and 23 in Denver. The program included the following addresses:

"Marketing of Colorado-Grown Products"—Kenneth Warden, U.S. Department of Agriculture
"Phenylketonuria" — Charles Streamer, M.D.
"Research and Consumer Services"—Joan Kemper, Kraft Foods.

Connecticut Dietetic Association. A one-day institute for administrative managerial personnel in hospitals, schools, and convalescent homes will be sponsored May 3 by the Food Administration Section of the Connecticut Dietetic Association, in Waterbury. The program will include a presentation on portion meats by a representative of Armour and Company, Waterbury; "Fresh and Frozen Fruits and Vegetables," by Joseph Scharek, Sales Manager, Edward Boker, New York City; a demonstration of color, merchandising, and combination of foods by Alice Easton, H. A. Johnson Co., Boston; and "How to Train Employees" by a representative of Standard Brands.

The April meeting of Southern Connecticut Dietetic Association, held in New Haven, featured a report on pediatric nutrition in Russia by Dr.

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Milton J. E. Senn. At the monthly meeting on May 12, Irene Yevitz, Lennox Hill Hospital, New York City, will talk on "Present-Day Labor Problems."

Iowa Dietetic Association. A joint spring meeting was held by the Iowa Home Economics and Dietetic Associations in Davenport on April 8. Included on the program were:

A report on the White House Conference on Children and Youth

"Communications"—Dr. Orville Hitchcock, Department of Speech, State University of Iowa, Iowa City

"Communication in Groups" — Dr. George Beal, Professor of Agricultural Economics and Rural Sociology, and Dr. Joseph Bohlen, Professor of Economics and Sociology, Iowa State University, Ames

Michigan Dietetic Association. The Michigan Dietetic and the Home Economics Associations met jointly in East Lansing on April 28 and 29. The first day's program was titled "Operation Bootstrap" and was concerned with performance on the job—orientation, in-service and continuing education. On the second day of the meeting, "New Trends in the 60's" were discussed. A report of the White House Conference on Children and Youth was made in the morning, while the afternoon was devoted to problems of the aging, discussed by panel.

Missouri Dietetic Association. On April 1, the Missouri Dietetic Association held its spring meeting at Cape Girardeau. Program highlights included:

"What Comes after Brown 'n' Serve?"—Herbert H. Wright, Administrator, Southeast Missouri Hospital, Cape Girardeau

"Innovations in Teaching Student Nurses"—Louise Neumann, Educational Director, St. Mary's Hospital, St. Louis

"Diet in Conjunction with Artificial Renal Dialysis"—D. R. Seabough, M.D.

"Nutrition Education in Action"—a panel discussion by principals, teachers, and students of Cape Girardeau public schools.

Virginia F. Harger attended the meeting as official representative of A.D.A.

The annual Kansas-Missouri Workshop will be held June 23 to 25 at Kansas State University, Manhattan. The theme of the program will be "Public Relations and Evaluation."

In January, the *Greater Kansas City Dietetic Association* heard Dr. Genevieve Stearns, Research Professor Emeritus, State University of Iowa, Iowa City, speak on "Changes in Requirement at Various Phases of Growth in Children and Adolescents."

The *Central Missouri Dietetic Association* prepared an exhibit on emergency food supplies for a meeting in Columbia on February 9 of the Women's Division, of Civil Defense.

New Jersey Dietetic Association. The *New Jersey Diet Manual*, a 1958-59 project of the Diet Therapy Section of the New Jersey Dietetic Association, has been published by the state Department of Health and distributed to 168 nursing homes and 106 hospitals throughout the state. The *Manual* has the endorsement of the Medical Society of New Jersey, the New Jersey Hospital Association, and the state Department of Health and distributed New Jersey Dietetic Association.

The New Jersey Dietetic Association will exhibit at a Health Fair during May sponsored by the Essex County Interprofessional Health Council. The *Northern Jersey Dietetic Association* has recently become a member of this Council.

Oklahoma Dietetic Association. Oklahoma dietitians met in Oklahoma City on March 11 and 12. The program featured:

"Selling Ourselves to Others"—Dr. Alex Warren, Oklahoma State University, Stillwater

"Phenylketonuria in Oklahoma—A Preliminary Survey"—Sylvia O. Richardson, M.D., University of Oklahoma Medical Center, Oklahoma City

"How Well Do We Sell?"—A. June Bricker, Metropolitan Life Insurance Company, New York City

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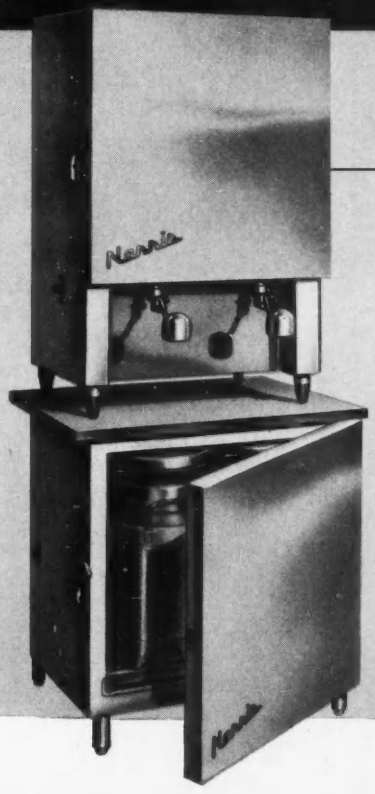

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Coronary Prevention Evaluation Program"—Jeremiah Stamler, M.D., Chicago Board of Health
"This Business of Catering"—Peggy Richards, Glen's Hik-ry Inn, Oklahoma City
"Disaster Planning for Hospitals"—Lt. Col. Katharine E. Manchester, AMSC, Brooke Army Hospital, San Antonio, Texas
"The White House Conferences of 1960 and 1961"—Rheba L. Edwards, M.D., Oklahoma Department of Mental Health, Oklahoma City

A.D.A. representative at this meeting was Lorraine Weng, National Dairy Council, Chicago.

Puerto Rico Dietetic Association. On November 27, members of the Puerto Rico Dietetic Association met at the Dorado Beach Hotel. Highlight of the program was a talk by Dr. Nelson Fernandez Lopez, Medical Consultant, Puerto Rico Department of Health, on "Ionizing Radiation in the Preservation of Food."

Last July, dietitians of the Veterans Administration Hospital, San Patricio, presented a one-day training program in cycle menus for the Food Administration Section. Twenty-eight dietitians participated. Cycle menus were planned for use in different types of hospitals. Since the meeting, members of the Association have visited a number of hospitals to see how the menus are working out and to help with adaptations when needed.

The Public Relations Committee of the Puerto Rico Association this year has made a special effort to encourage students to become junior members of A.D.A. The "campaign" has thus far resulted in four new junior members for the Association. Other work of the committee has been in relation with television and publicity programs.

South Carolina Dietetic Association. South Carolina Dietetic Association, in conjunction with the Charleston County Heart Council, held its spring meeting in Charleston, March 11. Guest speaker for the occasion was Marjorie Cantoni, Nutrionist, Heart Disease Control Program, U. S. Public Health Service. Miss Cantoni spoke on research in nutrition as related to coronary diseases. She emphasized that the problem of coronary disease is unsolved. The dietitian should support the physician in his varied requests, even though he is following a hunch. The answer to the problem may result from such a hunch.

Washington State Dietetic Association, April 8 and 9 were the dates of the spring meeting of the Washington State Dietetic Association held in Pullman. Program highlights included:

"New Trends in the Food World"—a symposium with four discussants from Washington State University, Pullman
"Fat Metabolism: Of Mice and Men and Diet"—Dr. Mary Rose Gram, Department of Foods and Nutrition, Washington State University
"Magnesium Content of Food"—Gweneth Nelson, Agricultural Experiment Station, Pullman
"Nutritional Status of Washington Teen-agers"—Margaret Hard, Department of Foods and Nutrition, Washington State University
"Research on Meats and Meat Cookery"—Dr. Marion Jacobson, Department of Foods and Nutrition, Washington State University
"Use of Non-Caloric Sweeteners in Freezing Peaches"—Margaret Hard
"Implications of Consumer Market Research for Dietitians"—Dr. Edna Douglas, Agricultural Experiment Station, Pullman.

Gertrude Miller, Speaker-Elect of the A.D.A. House of Delegates, attended this meeting as the national Assocation's representative.

Association Activities

Continuing Education in Management. The A.D.A. Executive Board announces the appointment of Jane Hartman as Coordinator of a week's program in management for Association members. The workshop has been

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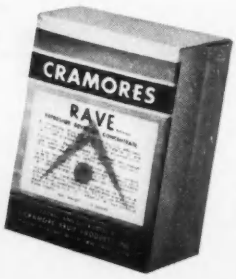

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tentatively scheduled to be held the week of July 11 through 15 at Webster Hall, Pittsburgh. Professor C. L. Van Sickle, Graduate School of Business Administration, University of Pittsburgh, is cooperating in the planning of this week's program.

Management is a vital function in positions held by many of our members. The membership of the Association has requested this type of meeting, and we anticipate much interest. The program will be keyed to top-level management in all areas of our profession. Lectures, case-study presentations, and small group analysis will be featured in presenting such subjects as the art of delegating, basis of decision-making, human problems in management, and related subjects.

Further detailed information will be available to members in the near future. Pre-registration will be necessary, with attendance limited to Association members.

Publications and Reprints Listing. A new *Publications and Reprints* listing is available from A.D.A. Headquarters office on request. Please enclose a self-addressed stamped envelope.

Dietetics as a Profession. Just off the press is a new revision of *Dietetics as a Profession* — the Association's most complete description of our profession. Enlarged to the size of 8½ by 11 in. and lengthened to forty pages, the booklet is augmented in the information it provides and is equal in attractive design to the last revision.

It is strongly recommended that a copy be placed in every school, college, and public library and that a copy be made available to every young person who may be interested in becoming a dietitian or nutritionist.

Revision of Graduate Opportunities. Margaret Warde, Chairman of the Education Section Committee, "Ways and Means of Encouraging Advanced Study by Members," has revised "Graduate Opportunities," which appears in the February 1960 issue of the *Journal of Home Economics*.

This listing is available from A.D.A. Headquarters office for 25 cents a copy.

1960 National Health Forum. Nelda Ross Larsson, one of our three Council representatives to the National Health Council, as our official representative, attended the 1960 National Health Forum, March 14 to 17 in Miami Beach.

Several members of the Association participated in the program. Adelia Beeuwkes, University of Michigan, reviewed thirteen years of literature on "What We Know about Food Habits of the Elderly." She stressed that there should be a longitudinal plan in the nutritional picture, that food habits might be studied throughout life; and that tools must be developed to obtain dietary information of large groups over a long period of time, quickly and inexpensively. Dr. May Reynolds, University of Wisconsin, speaking on "The Nutritional Status of Older People" reviewed findings of various research groups. Dr. Margaret A. Ohlson commented on future nutrition research.

National Social Welfare Assembly. Henderika J. Rynbergen, New York Hospital School of Nursing, New York City, was the official A.D.A. representative at a meeting of the Committee on International Activities of the National Social Welfare Assembly, held April 22 in New York City.

Civil Defense. The following Regional Conferences of Women's Civil Defense Councils were attended by A.D.A. representatives:

April 4-6—Dorothea Nicoll, *Region 1*, Topsfield, Massachusetts
April 5-7—Dorothy Bovee, *Region 2*, Washington, D.C.
March 21–22 — Margaret Warde, *Region 7*, Alameda, California
May 19-20—Ruth L. Mercer, *Region 8*, Portland, Oregon

A report from Margaret Warde concerning the meeting of Region 7 emphasized the professional woman's responsibility to prepare her own home and her community for natural disaster or for "fallout." The shelter program and need for building more home shelters were stressed, and a home-

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Cleveland, Ohio • October 18-21, 1960

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Hotel	Single Bed	Double Bed	Twin-Bedded	Suites
Auditorium	$6.00- 9.50	$7.75-11.50	$11.00-14.00	$28.00-38.00
Manger	6.00-10.00	9.00-11.00	10.00-14.50	22.00-32.50 2 rms.
		Studios	14.50-30.00	39.00-60.00 3 rms.
Pick-Carter	6.50-10.75	9.50-14.00	11.00-16.00	27.50-37.50 2 rms.
				41.50-51.25 3 rms.
Sheraton-Cleveland*	7.00-11.00	10.50-14.50	13.50-20.50	26.00-51.50 2 rms.
				47.00-70.00 3 rms.
Statler-Hilton	6.50-12.50	13.00-16.00	14.00-28.00	28.00-39.00 2 rms.
		Studios	16.00-30.00	51.00 3 rms.
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Colonial House Motel	7.50	9.00	10.00	
Colony Motor Hotel	4.00	6.00		
Lake Erie Motel	8.00	11.00-14.00	14.00	

In the event that the hotel room rate structure is changed prior to the above convention these rates will be changed accordingly.
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THE NAME OF EACH HOTEL GUEST MUST BE LISTED. Therefore, please include the names of *both* persons for *each* double room or twin-bedded room requested. Names and addresses of all persons for whom you are requesting reservations and who will occupy the rooms asked for:

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If the hotels of your choice are unable to accept your reservation the Housing Bureau will make as good a reservation as possible elsewhere provided all hotel rooms available have not already been assigned.

preparedness teaching kit was presented to each person present. These kits are available through your regional office of the Office of Civil Defense Mobilization.

White House Conference on Children and Youth. Representing A.D.A. at the White House Conference on Children and Youth in Washington, D.C., March 27 to April 2, were:

Adult Nominees: Dr. Ercel S. Eppright, Head, Department of Food and Nutrition, Iowa State University, Ames; Dr. F. Eugenia Whitehead, Professor and Chairman, Department of Home Economics, State University of Iowa, Iowa City; Dr. Helen A. Hunscher, Chairman, Department of Home Economics, Western Reserve University, Cleveland; and Dr. Icie Macy Hoobler, A.D.A. Representative on White House Conference Council on Children and Youth, Ann Arbor, Michigan.

Young Adult Nominees: Gladys Witt Strain, Graduate Student in Nutrition, Western Reserve University, Cleveland; Florence L. Gemmell, Nutrition Department, The Clinical Center, National Institutes of Health, Bethesda, Maryland; Barbara A. Duren, Dietetic Intern, Freedman's Hospital, Washington, D.C.; and Lt. Eloise Nielsen, Dietetic Intern, Walter Reed Army Hospital, Washington, D.C.

A report will follow.

Joint Committee of A.D.A. and A.H.A. The Joint Committee of The American Dietetic Association and the American Hospital Association met on February 6 in Chicago with Lucille M. Refshauge, Chairman of the A.D.A. representatives and Chairman of the Joint Committee, presiding. Henrietta Henderson, Constance Hilton, and Myrtle Van Horne were the Association's representatives present at the meeting. Dr. Doris Johnson, Wilma F. Robinson, and Ruth M. Yakel attended as ex-officio members.

One subject of particular interest which was discussed concerned further encouragement of delegation of duties by the dietitian and the use of part-time and shared dietitians. The Joint Committee discussed ways to encourage state and local dietetic associations to cooperate with state and metropolitan hospital associations in planning joint programs of interest to both the dietitian and the administrator.

The American Dietetic Association is sending to executive secretaries of state hospital associations information of interest to them, including a kit of reprints of articles from the JOURNAL.

Some time was also spent in discussing methods of evaluating food service in institutions for the chronically ill and aged.

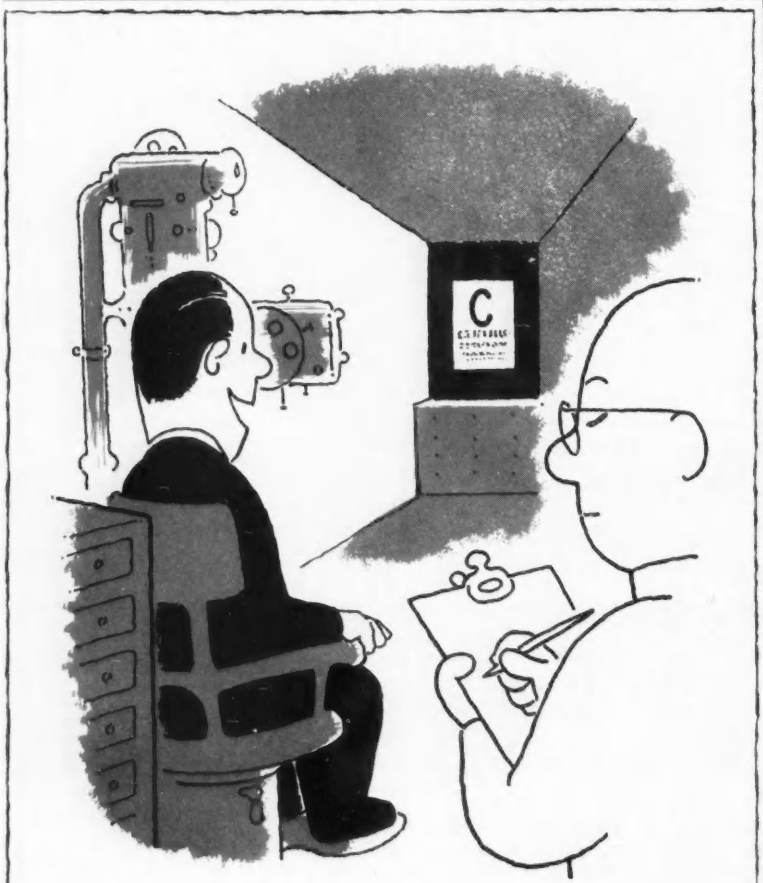
Joint Committee of A.D.A. and A.M.A. Dr. Doris Johnson and Dorothea Turner, A.D.A. representatives on the Joint Committee with the American Medical Association, attended an initial meeting of the committee on January 26.

Information was exchanged concerning activities of common interest in the two organizations. Briefly discussed were such subjects as the teaching of dietetics and nutrition to medical students, improved interpersonal relations of dietitians and physicians, and improved communications between the two organizations in all areas of common interest.

Obituaries

B. Violet Cummings. The A.D.A. office has learned of the death last November of B. Violet Cummings of Maynard, Minnesota. Miss Cummings for a number of years was vocational homemaking teacher, Buffalo Center, Iowa. She had made her home in Maynard since 1955. She became a member of A.D.A. in 1930.

Ouida Weimer. Headquarters office has been notified of the death of Ouida Weimer on March 18, in Marshall, Texas. Miss Weimer, who had been a member of the Association since 1947, was formerly an Army dietitian, having been stationed at Brooke General Hospital, Ft. Sam Houston, Texas; Fitzsimons General Hospital, Denver; and Walter Reed General Hospital, Washington, D.C. She had also been employed by the Veterans Adminis-



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History of The American Dietetic Association

1917-1959

Mary I. Barber, Editor

This is the first official history of the ADA from its inception in 1917 through 1959. More than being merely a record of the Association, its origin, structure, aims and accomplishments, this new book includes the many personalities that represent its leadership and explores the role of the dietitian from ancient times to the Space Age.

Chapter 1 considers the term "dietitian" historically, and presents a definition which describes the dietitian's responsibilities today. Chapter 2 outlines the history of dietetics from the ancient Ebers papyrus to the present, highlighting the achievements of great figures in the history of nutrition.

Chapter 3 gives an interesting account of the founding of the ADA. Chapters 4 through 7 record by decades the spectacular advances both of the ADA and of the science in general. Chapters 8 through 14 describe the structure of the Association, and the work of the various Committees and Sections devoted to education, community nutrition, diet therapy, etc.

Chapters 15 through 19 cover the history of dietitians in military and government service, the United States Children's Bureau and the role of the Journal of the ADA and the Association's Public Relations Department. Chapter 20 relates the challenging aspects of dietetics in the Space Age.

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tration and had served on the staff at the VA Hospital, Tuscaloosa, Alabama.

News of Products and Services

The editors will be glad to supply, on request, the addresses of any companies listed in this section.

W. H. Frick, Inc., has introduced a newly designed mobile tray and silverware dispenser. Stainless steel shelves with raised lip edges hold 180 trays, size 15¼ by 20¼ in. The silverware housing has ten removable silverware containers, each holding 100 to 120 knives, forks, or spoons. Additional strength is supplied by the stainless steel chassis plates which are welded to the frame.

An instantly soluble powdered bouillon for chicken and meatless consommé is announced by *Louis Milani Foods, Inc.* Both products are packaged in individual serving portions in moisture resistant, aluminum foil envelopes. No cooking is needed; by simply pouring the powder into a cup of hot water, it is ready to serve.

Sliding glass doors are features of both a new 45-cu. ft. refrigerator and a companion freezer with matching design, manufactured by *Nor-Lake, Inc.* The new models, R-45G refrigerator and 45XHG freezer, are especially adapted for self-service. The sliding glass doors facilitate selection before the doors are opened. An improved blower coil, or ice maker evaporator, highlights operational features of the refrigerator; the freezer has automatic hot gas defrosting. Both units have eight adjustable wire shelves. Other features include baked white enamel finish or stainless steel exterior, hermetically sealed compressors, and removable louvered panel situated below the keyed locking doors.

"Swirl-A-Heat," a new cup heating system, has been incorporated into all AMF LOWERATOR self-leveling cup dispensers by the *Lowerator Division, American Machine & Foundry Company.* The system brings in cool air, which is passed through the pre-heating chamber by a multi-blade turbine wheel driven by a four-pole, shaded induction motor. The air is then forced over a 1200-watt, ring-type heater and distributed to the cup dispensing chamber by a diffuser plate. Less space is required for the system because 25 per cent less power is used, making possible a more compact unit.

A new "Jumbo Jungle" paper cup line, designed for children, is offered by the Bondware Division of *Continental Can Company.* Printed in red, white, and blue, cold drink cups feature a parade of animal characters —from camels to zebras—which differ with each cup size. Rounding out the line are ice cream cups in pastel colors with a different combination of animals on each size cup. The ice cream cups may also be used for salads and puddings, or for portion control of condiments, jellies, and jams. All cups in the new line are waxed to maintain true drink flavor. Both the cold drink cups and ice cream cups are available with snap cap and tab lids.

Borden Foods Company has introduced a new, 16-serving package of instant whipped potato flakes. The new package contains loose flakes instead of pre-measured envelopes containing enough flakes for 4 servings, as in the case of the 8-serving package. Using the new package will mean a saving of about 7 cents per package for homemakers.

G. S. Blakeslee & Co. has announced a redesigned series of compact, counter-type dishwashers: the A6 and AT6. The new units have been designed with a horizontal pump and motor arrangement which reduces from 24¾ in. to 16⅞ in. the depth needed below the counter top for installation. The A6 can be installed in 4 sq. ft. of counter space. Equipped with automatically timed wash, dwell, and rinse cycles, the new machines are recommended for feeding operations serving up to fifty persons.

An 8½ by 11-in. "file folder" from the *Cereal Institute* shows in chart form the Recommended Dietary Allowances and the nutritional contribu-

HANDBOOK OF DIET THERAPY

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tion of a basic cereal-and-milk, moderate low-fat breakfast. Printed on extra heavy paper, the folder is adapted for use as a wall chart when open. The basic breakfast advised is: orange juice, 4 oz., cereal, dry weight, 1 oz., whole milk, 4 oz., sugar, 1 tsp., toast (white, enriched) 2 slices; butter, 5 gm. (about 1 tsp.); nonfat milk, 8 oz. The Recommended Dietary Allowances computed in calories with the nutritional values of protein, minerals, and vitamins tabulated are presented for age groups, with percentages of the total daily dietary intake contributed by the basic breakfast.

An illustrated, twenty-four-page booklet from *The Hobart Manufacturing Company* describes sixteen models of automatic and semi-automatic dishwashers for both large and small food service operations, with capacities ranging from 20 persons to 2600. Included are three glasswashers, four food waste disposers, and three dish scrappers designed for use with automatic dual-driving dishwashers. A brief text with each model outlines uses and specifications. Features of the equipment are the dual-drive principle on automatic dishwashers, time control, jet-type fill, and the vacuum breaker.

Nu-Way Foods Co. has added "Cream Sauce Base" to its line. The sauce is prepared by adding water and bringing to a boil. It is suggested for vegetables, croquets, chicken à la king, chipped beef, and casseroles.

A new lemon cream dessert and pie filler requiring only the addition of egg yolk and water is announced by *Continental Coffee Company.* The 26-oz. box makes three 9-in. pies or twenty-four 3-oz. servings of pudding when four egg yolks are added. A lemon cream sauce can be prepared by doubling the amount of water. Ingredients are: concentrated oil of lemon, sugar, corn starch, salt, citric acid, and U. S. Certified color. The polyethylene coated aluminum foil inner bag is hermetically sealed to keep out moisture and prevent deterioration. The product is also available in 5-lb. cans, packed six to a case.

Additional sizes of its recently introduced Griptite Lid series by *Lily-Tulip Cup Corporation* have been announced. New sizes apply to No. 160, No. 16, and No. 24 and are designated P616, P626, and P624. Sixteen different sizes are now available. The opaque, plastic lid was designed for take-out, cold drink orders. It is easy to apply and has good retention qualities. The surface may be written on, permitting quick, legible order identification. The lid is packaged in a self-dispensing tube.

A six-page recipe folder using "Creamtex," is available from *Durkee Famous Foods.* Creamtex is an all-hydrogenated shortening for use in baking or frying or in icings. The recipes include yellow and devil's food cakes and basic cream, chocolate, and cooked butter cream icings. The inside fold is perforated to allow placing of the recipes in a standard 5 by 8 in. file.

A portable hot and cold bulk food conveyor utilizing a variety of pan combinations has been introduced by *Swartzbaugh Manufacturing Company.* By using fractional pans and substituting round utensils in a convertible 8½-in. well, any menu or combination of regular and modified diet items may be handled. Units are available with a capacity of 348-qt. food. The conveyor may be maneuvered by one operator and is low enough to be used as a serving counter. It is constructed of nickel-bearing stainless steel.

Twenty-four cards with seventy recipes, including soups, sauces, main dishes, casseroles, salads, sandwiches, and vegetables, made with Campbell's soups and Swanson Chunks O' Chicken and Turkey are offered by *Campbell Soup Company.* Sections are illustrated with color photographs. Each recipe shows portion weight, number of servings, ingredients in measure and weight, and the method of combining.

A new high density potato flake for greater yield is now offered by *Pillsbury.* In addition to the regular 10-lb. can, a new 5-lb. "soft pack" requiring less storage space, fewer disposal problems, and fewer containers to open is being marketed. Using whole milk in combination with the flakes, portion costs are 1.7 cents for the 5-lb. pack compared with 1.9 cents from the can. Combined with milk solids, comparable costs are 1.43 cents using the 5-lb. pack and 1.65 cents from the 10-lb. can. The 5-lb. package yields 164 3-oz. servings compared with 82 servings per can. However, the new flakes permit 42 per cent more product to be packed in each can.

Two new flavors have been added to the Junket line of *Salada-Shirriff-Horsey Inc.* The new banana flavored rennet-custard powder brings the total of flavors to eight. A custard is made by adding 1 pt. fresh milk. Cherry-plum is the new Junket Danish dessert made by adding water. Earlier flavors are strawberry and currant-raspberry. A series of recipes for institutional use, featuring the Danish dessert and rennet-custards, is available from the manufacturer.

Bakers Pride Oven Co., Inc., announces a new heavy-duty, two-deck electric pizza oven (Model L02E), designed to fit backbar or counter space. The unit will bake up to twenty 16-in. pizza crusts an hour. Other features are: stainless steel tubular heating elements, removable transite hearths, 700° double-pole thermostat, and 15-min. bell timer. The oven is available in Bakertone gray or stainless steel exterior.

Silite has developed a plastic pitcher for hot or cold liquids with a 44-oz. capacity. The pitcher is a modern design, jet black in color, to match the Ebony Diamond line of salad and serving bowls.